

MASS.
DOCS.
COLL.

* UMASS/AMHERST *



312066 0285 1940 7

REPORT
OF
HARBOR AND LAND
COMMISSIONERS

1903

UNIVERSITY OF
MASSACHUSETTS


GOODELL
LIBRARY



J

R

THIS BOOK-PLATE IS A GIFT OF DR. WILLIAM GOODELL



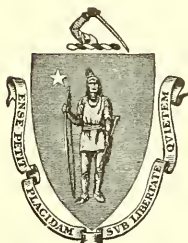
Digitized by the Internet Archive
in 2011 with funding from
Boston Library Consortium Member Libraries

ANNUAL REPORT

OF THE

BOARD OF HARBOR AND LAND COMMISSIONERS.

FOR THE YEAR 1903.



BOSTON :
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1904. .

APPROVED BY
THE STATE BOARD OF PUBLICATION.

1044050
UNIV. OF CALIF.
LIBRARY

Commonwealth of Massachusetts.

REPORT.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.

The Board of Harbor and Land Commissioners, pursuant to the provisions of law, respectfully submits its annual report for the year 1903, covering a period of twelve months, from Nov. 30, 1902.

From Dec. 1, 1902, to Nov. 30, 1903, the Board has held 226 meetings, has given 258 formal and informal hearings, and has received 140 petitions for license to build and maintain structures and for privileges in tide waters, great ponds and Connecticut River, to dredge material, to remove material from beaches, and for other purposes.

One hundred and twenty-one licenses for structures and privileges in tide waters, great ponds and Connecticut River, have been granted during the year; also 21 permits for dredging, for the removal of material from beaches, and for other purposes.

Eighty-five inspections have been made at various times by the Board, and under its direction, of work completed and in progress, also of sites of authorized work, under appropriations made by the Legislature, relating to: dredging operations in Boston harbor; improvements on the Commonwealth's flats at South Boston; improvements in South Bay; the reclamation of the Province Lands in Provincetown; protective works on the Connecticut River at Hadley; bank of Connecticut River at Hatfield; Annisquam River in Gloucester; Bass River in Beverly; sea wall and jetties at

Stony Beach in Hull; sea wall at North Scituate; site of proposed wall on beach between the first and second cliffs in Scituate; breakwater in Apponagansett harbor; Quicks Hole and ponds on Nashawena Island; Stage harbor in Chatbam; jetties and channel at Menamsha Inlet; jetties and channel at Lake Anthony; Nantucket harbor; jetties and channel in Bass River at South Yarmouth; East and West bays at Osterville; Herring River at West Harwich; Witchmere harbor in Harwich; also, upon petitions and plans presented to the Board, of the sites of proposed work in tide waters, great ponds and Connecticut River, the location of wrecks and obstructions to navigation, and various structures built under licenses from the Board; piers and docks in New York city; sites suggested for location of a new drawbridge between Fall River and Somerset.

Through transactions of the Board there has been paid into the treasury of the Commonwealth during the past year, from rents, licenses, sales of land and other sources, and credited to the Commonwealth's flats improvement fund and the harbor compensation fund for Boston harbor, the aggregate sum of \$57,162.87.

During the year the Board made 4 new contracts,* involving the estimated expenditure of \$28,513.10.

COMMONWEALTH TIDE LANDS.

The Governor and Council, under the provisions of section 24 of chapter 96 of the Revised Laws, determined that the compensation for the rights granted in land of the Commonwealth, to be filled or otherwise occupied under the following licenses granted by the Board during the year, should be as stated below:—

No. 2692, granted December 18, to the city of Boston, to repair and extend its wharf at Rainsford Island, in Boston harbor, \$18.66.

No. 2694, granted December 18, to the American Linen Company, to build a sea wall and fill solid on Taunton River, in Fall River, \$100.

No. 2695, granted December 18, to the Fall River Iron

* See Appendix A.

Works Company, to build a sea wall and fill solid on Taunton River, in Fall River, \$100.

No. 2727, granted April 15, to the Boston, Revere Beach & Lynn Railroad Company, to build a pile structure and dolphins, to fill solid and dredge, in Boston harbor, at East Boston, \$760.80.

No. 2750, granted June 22, to Paul Butler, to extend his wharf in Gloucester harbor, \$1,000.

No. 2758, granted June 29, to John Duff, to extend his wharf on Acushnet River at the easterly side of Fish Island, in New Bedford, \$300.

No. 2762, granted July 8, to Reed & Gamage, to extend their wharf in Gloucester harbor, \$300.

No. 2772, granted July 20, to the J. M. Guffey Petroleum Company, to build a wharf and bulkhead and fill solid in Beverly harbor, in Beverly, \$2,500.

No. 2773, granted July 29, to the Old Colony Street Railway Company, to build a sea wall and fill solid in Mount Hope Bay, in Fall River, \$2,000.

No. 2779, granted September 11, to the Whitman Mills, to build a bulkhead and fill solid on Acushnet River, in New Bedford, \$100.

No. 2783, granted September 21, to Sylvanus Smith, to extend his wharf in Gloucester harbor, \$200.

No. 2798, granted October 27, to the Fall River Gas Works Company, to build a wharf in Mount Hope Bay, in Fall River, \$1,000.

BOSTON HARBOR.

The importance of the port of Boston to the Commonwealth can never be overestimated. It is the natural tide-water doorway for the great north-west, and every step of development of that territory in raising products for shipment abroad is of vital interest to the capital city of New England. The influx of upwards of 50,000 people into the Manitoba, Assiniboia, Alberta and Saskatchewan districts is a movement of distinct advantage to Massachusetts. Such Canadian winter ports as are open cannot enter into competition on even rates, and it is for the interest of the railroads centring here to get the travel and the business.

The vote of the people of the State of New York to enlarge the Erie canal for navigation by 1,000-ton barges, at an outlay of over \$100,000,000, is an interesting object lesson to us. The increased export of cereals by way of the Mississippi and St. Lawrence rivers emphasizes the existing competition, and points the necessity of reducing cost of transportation through the northern Atlantic seaports, if their due proportion of the entire business is to be retained. Shipments through Boston must of necessity be all rail to the port; consequently, competing economy must be found in increase of economic facilities at the terminal by way of enlarged accommodations, cheap handling and quick despatch.

The advantage of being but 9 miles from the open sea, as against 27 in New York, and about 500 from Montreal down the St. Lawrence, counts for something. The saving of 180 miles as against New York in the ocean passage to Great Britain and the continent of Europe is another favorable item. The increase in the depth and width of our harbor channels, when the same shall be dredged and liberally buoyed and lighted, should be another factor of advantage, by making a quicker, easier and safer waterway between the docks and the ocean. The closing of the St. Lawrence to winter navigation affords an opportunity for creating a closer relationship between the railroads centring at Montreal and Boston, with a view to making Boston the winter port for upper Canada.

The abrogation in September last by the International Mercantile Marine of the minimum freight rates on foreign exports tends to give freer play to the natural advantages possessed by our great seaports, and its influence was immediately felt here by increase of shipments.

The 1899 project of the federal government for a new ship channel from President Roads to the sea through Broad Sound, 30 feet deep at mean low water and 1,200 feet wide, is substantially complete and ready for navigation by the largest ocean steamships when sufficiently buoyed and lighted. More buoys are needed to guide the mariner through a new passage than through one well known, and a

conservative captain or pilot is slow to adopt a change until the more adventurous or enterprising have established its superiority. The greater safety and shorter course of the Broad Sound channel will, however, in due time be recognized as a great and beneficial improvement.

A lighthouse of granite, with a light of the first order, is building at the outer Graves to mark the entrance to Broad Sound, on a location ceded to the United States by the Commonwealth at the last session of the Legislature.

The Congress of 1902 approved the project for another channel through Broad Sound, 35 feet deep at mean low water and 1,500 feet wide, to President Roads, and for deepening the main channel from President Roads to the Charlestown and Chelsea bridges to 35 feet at mean low water and broadening it to 1,200 feet where possible, at an expense of about \$8,000,000, and authorized contracts to the amount of \$3,600,000 for beginning and prosecuting the work. Contracts have been let, and the work is progressing. The summary of work done by Lieut.-Col. W. S. Stanton, Corps of Engineers, U. S. A., on page 56 of this report, shows the present condition of the project.

A comparison between the tonnage entering the principal ports of the world, according to a table prepared by the Department of Commerce and Labor at Washington, and the port of Boston, may be interesting. The coastwise trade is excluded.

PORT.	Year.	Entered (Tons).	Cleared (Tons).
London,	1902	10,179,023	7,385,085
New York,	1902	8,982,767	8,415,291
Antwerp,	1902	8,373,528	8,347,483
Hamburg,	1902	7,860,323	7,993,166
Hongkong,	1901	7,383,683	7,340,586
Liverpool,	1902	6,843,200	6,314,514
Cardiff,	1902	4,688,088	7,868,556
Rotterdam,	1901	5,950,445	5,733,763
Singapore,	1901	5,459,032	5,453,999
Marseilles,	1902	4,911,784	4,552,088
Tyne ports,	1902	3,615,046	4,754,301
Gibraltar,	1901	4,171,350	4,159,272
Boston,	1902	2,416,918	1,852,078

While the showing indicates much to be gained by Boston in order to equal the tonnage at the port next higher, it is encouraging to turn back and see the growth here since 1875, when the registered tonnage entered was 768,678, and that cleared 632,873.

The ports that want the business must provide required accommodation. The tendency continues toward increasing the size of vessels; and their limit, which is measured solely by economic considerations, has as yet not been reached. Meanwhile, two steamships to sail under the flag of the United States are building for the trade between Puget Sound and the Orient, with a carrying capacity of 25,000 to 28,000 tons, in which the ratio between the cost of carrying and handling cargo has been most carefully considered.

In this connection it is worth noticing that Philadelphia is asking the federal government for a channel down the Delaware, to be dredged to a depth of 40 feet; and that Liverpool, whose expenditures for commercial improvements never halt, is about providing at some of her docks for a depth of 40 feet on the sills at high water of neap tides, and for the accommodation of vessels 1,000 feet in length. Provision is also being made at Liverpool for several new graving docks, one of which, at the South Carriers Dock, is to be 800 feet long. One or more adequate graving docks are deemed essential to every foreign port of the first class.

ANCHORAGE.

The work of excavating additional anchorage ground in Boston harbor, as authorized by chapter 476 of the Acts of 1901, which also provides for the expenditure of an amount not exceeding \$1,000,000 out of the Commonwealth's flats improvement fund for carrying out the provisions of the act, has been prosecuted during the year under contracts made in 1902. The work is divided into four sections, the larger part of the material excavated being dumped at sea. A portion of the material from Section 1 is being used for filling the Commonwealth's flats at South Boston.

Owing to the large amount of work now being done in the harbor by the federal government and private parties, all

dredges have been fully employed, and the contractors have not been able to comply with the full requirements of the specifications for excavating the anchorage.

Work has been prosecuted nearly continuously on sections 1, 3 and 4 throughout the year. On Section 2 the contractors, George H. Breymann & Brothers, have, with the consent of the Board, assigned their contract to the Morris & Cumings Dredging Company, which has undertaken to complete the work by April 1, 1905.

The amount of material excavated from each section during the year, and the total amount excavated up to Dec. 1, 1903, is as follows: —

	Amount excavated from Dec. 1, 1902, to Dec. 1, 1903 (Cubic Yards).	Total Amount excavated to Dec. 1, 1903 (Cubic Yards).
Section 1,	232,793	403,447
Section 2,	76,631	188,146
Section 3,	391,030	406,357
Section 4,	391,188	404,993
Totals,	1,091,642	1,402,943

About six-tenths of sections 1, 3 and 4 have been excavated to a depth of 30 feet at mean low water, and about one-third of Section 2. These excavations have already materially increased the anchorage ground for deep-draft vessels.

The total amount expended on this project to Dec. 1, 1903, is \$198,591.66.

DREDGING IN BOSTON UPPER HARBOR.

The work of dredging a channel 27 feet deep through the bar at the confluence of Charles and Mystic rivers, under a contract with the New England Dredging Company which was in force at the date of the last report of the Board, was completed Feb. 2, 1903. This work was undertaken in consequence of complaints that vessels had grounded on shoals in this portion of the channel while approaching the docks at

Charlestown. Notwithstanding the area to be dredged is within the lines of the channel to be improved by the federal government, more speedy action was desirable for immediate relief, as the government work would not be advanced sufficiently to remove the objectionable shoals for several years.

In all, 104,101 cubic yards of material were excavated, and most of it carried to sea, while a small portion was used for filling the Commonwealth's flats at South Boston. The work was done at an expense of \$27,464.79, and paid for out of the income of the harbor compensation fund.

DORCHESTER BAY.

The work of dredging anchorage basins for yachts near the yacht landings on the southerly side of South Boston, under chapter 425 of the Acts of 1902 which authorizes an expenditure of \$100,000, has been prosecuted continuously during the year, except from June 15 to September 15, when work was suspended in order not to interfere with the occupation of the areas by yachts. The excavated material has nearly all been used in filling the Commonwealth's flats on the northerly side of South Boston, only a small amount being taken to sea.

A little more than one-half of the smaller area near K and L streets, and a little less than one-half of the larger area near O and Q streets, have been dredged, the smaller area having been excavated to the depth of 6 feet and the larger area to 9 feet at mean low water. During the year 219,410 cubic yards have been taken out, making the total amount excavated up to Dec. 1, 1903, 230,622 cubic yards. The amount expended to the same date is \$42,220.06.

DREDGING EASTERLY SHORE OF DORCHESTER.

By chapter 439 of the Acts of 1903 the Board was instructed to dredge a channel off the easterly shore of the Dorchester district in the city of Boston, and authorized to expend for the purposes of the act \$25,000. During the summer conference was had with representatives of the yacht clubs which are located in that vicinity, and in November a

survey of the territory between Savin Hill and Commercial Point was made, and is now being plotted. It is expected that plans will be completed and proposals advertised so that the dredging can be commenced early in the coming season.

The amount expended up to Dec. 1, 1903, is \$220.02.

DREDGING NORTHERLY SHORE OF QUINCY.

By chapter 366 of the Acts of 1903 the Board was instructed to dredge a channel off the northerly shore of Quincy, between Wollaston and Squantum, and authorized to expend \$7,500 therefor. A survey was made of the locality in July, and a conference had with representatives of the yacht clubs in that vicinity, and with the Metropolitan Park Commissioners who have acquired the shore front for a considerable distance on either side of the proposed channel. After this conference, plans were prepared for a channel 40 feet wide and 3 feet deep at mean low water, and about 2,300 feet long, extending from deep water up to a point abreast of the proposed location of the Wollaston Yacht Club house, whence a branch channel of the same depth and width, 370 feet long, is extended to the Squantum Yacht Club house.

Specifications have been prepared and proposals invited for the work, which is to be completed before the next yachting season.

The amount expended up to Dec. 1, 1903, is \$60.

WEYMOUTH FORE RIVER.

By chapter 440 of the Acts of 1903 the Board was directed to dredge the channel in Weymouth Fore River to a depth not exceeding 24 feet at mean low water, under an appropriation of \$25,000. The purpose of the desired improvement was to enlarge and deepen the channel from the Fore River bridge at Quincy Point to the deep water opposite Germantown.

In June and July a survey was made of this portion of the river, and estimates made for the excavation of a channel 200 feet wide and 18 feet deep at mean low water. After consultation and inquiry, it was found that the United States engineers had already prepared estimates to present to the

next Congress for a channel 300 feet wide and 18 feet deep, very nearly in the same location as the channel outlined by the Board. In case this work was carried out by the national government there would be no necessity for the work by the Commonwealth, and it was deemed advisable to defer further action.

Early in October the Fore River Ship and Engine Company requested the Board to excavate a channel 15 feet deep at mean low water and 200 feet wide, in a slightly different location from the original plans, but following the line of deepest water in the natural channel, in order that barges drawing 22 feet loaded with boilers too large for transportation by rail, and which were to be placed in vessels under construction at the company's works, might reach the wharves. After consideration, the Board decided to make the improvement as desired. The demand was pressing, and a channel of this size will answer the requirements of navigation on this river until the larger channel planned by the government shall be excavated. A contract was entered into on Oct. 16, 1903, with the Harries & Letteney Company, to excavate the channel forthwith, for the sum of 29½ cents per cubic yard, scow measurement.

The total amount expended to Dec. 1, 1903, is \$4,705.95.

WINTHROP CHANNEL.

Early in May a petition was received from the Winthrop Yacht Club and others, asking the Board to examine the channel at Winthrop, and improve its navigable condition by removing obstructions and by dredging, to obtain a uniform depth of not less than 8 feet at mean low water. A survey was made, and the obstructions were found to be caused by shoals formed by the washing down of the banks of the old channel and thus reducing its depth and width. It was originally 8 feet deep at mean low water and 50 feet wide. The flats through which it was dredged are composed of silt, which had gradually washed down and partially filled it in. The outer portion of the channel was found to be very little affected, but the inner portion, for a distance of about 1,000 feet, required dredging. Five thousand four

hundred and five cubic yards of material were excavated and deposited in the cove between Cottage Hill and Point Shirley, in July, at a cost of \$1,837.97, paid from the income of the harbor compensation fund. The channel has now practically its full depth of 8 feet and width of 50 feet from its entrance to the steamboat wharf. The improvement is a material benefit to navigation in that part of Winthrop.

The total amount expended by the Commonwealth on this channel since 1898 is \$3,916.62.

SHIRLEY GUT.

In May a survey was made of Shirley Gut. It disclosed that the dredging done during the past year had widened and deepened the northerly entrance to the Gut, also that a considerable amount of dredging had been done at the end of the wharf on the Deer Island side. The storms during the winter had built out the end of Point Shirley, but not to quite such an extent as in the previous year. In the spring it was found that the shore subjacent to the siphon of the metropolitan sewer on the Deer Island side of the Gut was washing away. Subsequently the Metropolitan Water and Sewerage Board placed riprap over and around the siphon, to prevent further wear.

In June and July 2,890 cubic yards of material were excavated from the end of Point Shirley where the material had been washed in during the previous winter, thereby widening the channel out to the lines to which it was excavated the previous year. This dredging was done without expense to the Commonwealth, as the material excavated had a value to the contractor more than equal to its cost. In order that dredging may be done in this locality from time to time, a taking was made on April 23, 1901, as reported in that year, of the end of Point Shirley, for which a claim for damages was filed in the superior court. On Oct. 12, 1903, a settlement was effected with the owner of the land taken, by the payment of \$400, and a release of title to so much of the land theretofore taken as was not needed to preserve the water-way.

The total amount expended during the year is \$452.

THE COMMONWEALTH FLATS AT SOUTH BOSTON.

The principal work on the Commonwealth flats has been filling the 26-acre lot east of the area leased to the Metropolitan Coal Company. A portion of this territory was the lot leased to the Boston Molasses Company in 1902. By the terms of the latter lease the area was to be filled to grade 14, and certain improvements made in order to fit the premises for the purposes intended. The work of paving and draining the approach to the premises from Summer Street and laying a drain through the property, which was under contract to Jones & Meehan at the date of the last report, has been completed in a satisfactory manner at an expense of \$6,186.29. The gravel filling necessary to prepare the roadway for the paving was furnished and placed by the New England Dredging Company at an expense of \$1,593.10.

On March 26 a contract was entered into with George H. Cavanagh to build about 650 feet of bulkhead on the easterly side of the lot, to retain the material used for filling. This structure was completed July 11, 1903, at a cost of \$5,763.10. The work of filling the enclosed area above the level at which material could be dumped directly from scows was shortly after commenced with an hydraulic dredge, and prosecuted continuously since that time. Up to Dec. 1, 1903, 369,672 cubic yards have been deposited above that grade. This work is being done under the contract for excavating Section 1 of the anchorage basin in Boston harbor.

Early in January complaint was received that ledge or other obstruction existed near the entrance to the artificial channel to the wharves and docks leased to the coal companies. An examination was made of the locality by sweeping, but no obstruction could be found. Later a small boulder on top of the bank on the westerly side of the channel was discovered by a diver. This was removed, as were also a number of stones lying on the slope of the bank. At the same time a pile of dimension granite stones was

found on the flats to the south-west of the reported obstruction, which had a few days before been struck by the screw of a tow boat, breaking off three of the blades. Nine large stones were removed from this locality also. The total cost of this work was \$220.

On March 2, 1903, the Board executed a lease from the Commonwealth to the Brown-Wales Company of a parcel of land next adjoining it on the Commonwealth's flats northeasterly of Egmont Street, containing 13,250 square feet. The lease is for a term of three years from March 2, 1903, at a yearly rental of \$750, with the right to purchase subsequently, if exercised within a year from its date.

On June 22, 1903, the Board, under the provisions of chapter 377 of the Acts of 1902, executed a license * to the Brown-Wales Company to lay and operate a track on C and Egmont streets. This license is the first one issued under the provisions of the act, and was duly accepted by the company within the time stipulated.

A plan of the Commonwealth's land at South Boston is printed herewith.

COMMONWEALTH PIER.

The Commonwealth pier at South Boston, built under chapter 513 of the Acts of 1897 and for which the sum of \$400,000 was provided, remains in the same condition as it was last year. The dock on the westerly side and the berth at the end have a depth of 30 feet at mean low water. On the easterly side the dock, not having been dredged, has a depth varying from 4 to 15 feet at mean low water.

There has been collected during the year and paid into the treasury of the Commonwealth to be credited to the Commonwealth's flats improvement fund the sum of \$7,464.40, received for the use of the dock on the westerly side of the pier and the berth at the end of the pier by vessels loaded with coal and sugar, for discharging their cargoes into lighters alongside.

During the year a small quantity of gravel for surfacing

* See Appendix B.

has been placed in about the centre of the pier, amounting to 627 cubic yards, at an expense of \$313.50. The total cost of this pier to Dec. 1, 1903, is \$370,401.95.

NORTHERN AVENUE AND BRIDGE.

The failure of the city of Boston to accept chapter 507 of the Acts of 1901, in relation to the laying out and construction of Northern Avenue, rendered further legislation requisite. Accordingly, chapter 381 of the Acts of 1903 was passed for laying out the avenue, as well as a side street named Sleeper Street, which connects Northern Avenue with Congress Street across the lands of the Boston Wharf Company and the New England Railroad.

Upon the passage of said act the Board forthwith, on June 4, filed in the registry of deeds for the county of Suffolk a copy of section 1 of the act, together with a duplicate plan described therein, signed by the commissioners, in accordance with the requirements of section 2, and gave notice thereof to the city of Boston, the railroad companies and the Boston Wharf Company.

The release from the Boston Wharf Company provided for in section 3 has been executed and delivered; that from the railroad companies is still awaited. The city engineer has located the streets on the ground, and is preparing all plans necessary for the construction of the same and of the bridge. It is anticipated that the construction work will be commenced early in the spring, and actively prosecuted to completion.

The statute provides that the construction of the avenue across the lands of the Commonwealth shall be done by the Board of Harbor and Land Commissioners, and this will be undertaken as soon as the other work is nearing completion.

The location of this avenue and bridge is shown on the plan of the Commonwealth's land at South Boston, printed herewith.

THE COMMONWEALTH'S FLATS AT EAST BOSTON.

No physical change in these flats has taken place since the last report. In the autumn the claim of Jeffries for damages for the taking by the Commonwealth, under chapter 486 of the Acts of 1897, was settled just before going to trial by the payment of \$100.

The claim of the East Boston Company has resolved itself into two questions: first, as to what portion of the flats taken is owned by the East Boston Company; second, what damage has the company suffered by the taking. The first question is being tried in the Court of Registration, and the evidence in support of the contention of the Commonwealth has been to a large extent supplied from the plans in this office and the testimony of the chief engineer of the Board. As the case is sharply contested on both sides, and there are many and various law points at issue, a final determination seems to be far distant. Meanwhile, the second of the above questions awaits the decision of the first: wherefore it is deemed inadvisable to recommend improvements of the flats whereby their physical condition might be materially changed, before the jury who must eventually pass on the question of damages shall have had an opportunity to take a view.

In response to an inquiry from the Legislature in January last with reference to plans for a State dock at East Boston, or suggestions relating thereto, the Board replied in part as follows:—

Replying to the fifth inquiry, the Board has considered it the part of wisdom to refrain from formulating plans for prospective improvement of the Commonwealth's land at East Boston until a decision in the East Boston case should finally determine the questions in litigation.

Chapter 486 of the Acts of 1897, "for the purpose of securing public ownership and control of certain portions of the foreshore of Boston harbor," authorized this Board to take certain land and flats within described limits in East Boston. An issue of bonds of \$100,000 was authorized for the expenses incurred under the act. Section 5 authorized the Board to excavate channels, fill the

flats and generally improve the land and flats taken, "upon such plans as it may deem best." The size of the appropriation indicated to the Board the purpose of the Legislature to acquire the foreshore and flats before they became valuable, and to develop the same at some future time, when the demands of commerce seemed to require such development and an adequate appropriation should be made therefor.

Plans have been considered in a very general way only. Several considerations, in the opinion of the Board, would prevent the forming of plans for improvement of that locality at present. The chief objection at present is the unsettled condition of the grade crossing question in East Boston. Until that is fully and finally determined, it would be unwise, in the opinion of the Board, to develop these flats, and premature to form plans. The Commonwealth should be slow to again build piers and docks in any locality until access thereto is assured. The pier and dock of the Commonwealth at South Boston, which was built at an expense of about \$400,000, has lain unused for several years, simply for lack of a proper avenue of approach. The pier may remain unused until the piles are destroyed, unless Northern Avenue bridge shall be constructed.

Therefore, under these circumstances, further consideration of plans for developing the front at East Boston have been held in abeyance.

The decision of the commission on the separation of grade crossings at East Boston, owing to the effect it may have upon the value of the Commonwealth's flats, is awaited with interest, inasmuch as convenient railroad connections at grade are an all-important consideration in any project of development.

The total amount expended on account of this property, up to Dec. 1, 1903, is \$22,945.36.

SOUTH BAY.

The work of dredging a channel in South Bay, under contract with John C. Cobb, was completed Jan. 1, 1903. In all, 152,975 cubic yards of material were excavated, making a channel 110 feet wide on the bottom and 12 feet deep at mean low water from Dover Street bridge up along the wharves in rear of Albany Street to the mouth of Roxbury

Canal; thence across the bay in front of the wharves recently constructed by the Roxbury Central Wharf Company. The material excavated was used for filling an area of flats in the bay.

Business is gradually extending in South Bay and occupying the wharves constructed during the last few years, the channel excavated as above described forming an ample approach.

The amount expended for the improvement of this bay to Dec. 1, 1903, from the fund created by chapter 278 of the Acts of 1898, is \$38,451.69.

ANNISQUAM RIVER.

A survey was made of Annisquam River, and estimates of the cost of improving the channel thereof, in accordance with the provisions of chapter 71 of the Resolves of 1903, the appropriation therefor being \$1,500.

Annisquam River flows into Ipswich Bay on the northerly side of Gloucester, and extends southerly across the Cape, one of its branches extending nearly into Gloucester harbor on the southerly side of the Cape. Over the bar at its outlet there is a depth of about 7 feet at mean low water, and the channel, with a depth of not less than 6 feet at mean low water, extends as far as Wolf Hill about $11\frac{1}{2}$ miles from Gloucester harbor at the cut, so called. Above Wolf Hill the channel runs nearly dry at low tide, and above the railroad bridge the bottom rises to about 2 feet above mean low water. From the river a cut or canal extends through the marshes and beach into Gloucester harbor. The river and cut, with Gloucester harbor, thus form the easterly portion of Gloucester and Rockport into an island, to which the only highway approach from the mainland is over a drawbridge which crosses the cut or canal at Western Avenue.

The Gloucester branch of the Boston & Maine Railroad crosses the river about three-quarters of a mile north of the highway bridge. These two bridges are the only ones connecting the island with the mainland.

The tides in the river flow to and from Ipswich Bay as

far up as a point about midway between the railroad bridge and the cut, while the tides in the cut and the upper portion of the river flow in and out from Gloucester harbor. The cut, or Gloucester canal, was first excavated by Rev. Richard Blynman about 1643, under authority of the town, who also built and maintained a drawbridge over the cut for land travel. This cut remained open until about 1704, when it was closed by a severe storm. From an examination of the town records of Gloucester it appears that a good deal of difficulty was encountered in maintaining the cut and caring for the drawbridge. The cut as made by Mr. Blynman was a comparatively small affair, suitable only for small boats or shallops, but was of great benefit to the early settlers. With the advent of steam it was anticipated that the cut would be of much more value, and the Gloucester Canal Company was organized under chapter 79 of the Acts of 1822. It constructed the canal or cut in substantially its present shape. The Commonwealth advanced about \$1,500. An appropriation of about \$6,000 was obtained from the federal government, and an equal amount was subscribed by individuals. Only one small steam vessel was ever known to have passed through the cut, and the use of it by other boats declined. A drawbridge was maintained for a few years, and finally gave place to a bridge with a fixed span.

In 1866 the proprietors of Wolf Hill, who had opened a quarry, were authorized by the town to reopen the canal, and a contract was made by the selectmen with the proprietors in 1867 to construct a drawbridge as ordered by the county commissioners. The canal was opened at this time, and a drawbridge has been maintained there ever since.

The river is now used during the summer by a fleet of pleasure boats, also to some extent by fishing boats, especially those bringing bait caught in Essex and Ipswich rivers and Ipswich Bay to the fishing fleet in Gloucester harbor. Many new fishing vessels built at Essex are brought through the river and cut to Gloucester to be fitted out.

The topographic survey of the shore line, extending from Gloucester harbor to the mouth of the river at Ipswich Bay, and soundings throughout its whole length, appear on the

plan herewith. From inquiries among people interested in the project at Gloucester, it seems that the desired improvement should be the excavation of a channel with a depth of not less than 6 feet at mean low water from the head of the present 6-foot channel through the cut into Gloucester harbor. This channel should be 100 feet wide on the bottom, with the necessary side slopes, from the end of the present 6-foot channel up to the entrance of the cut; thence 60 feet wide on the bottom, with the necessary side slopes, through the cut into Gloucester harbor.

It is said that before long the city will be obliged to rebuild the bridge over the cut, in order to enable it to safely carry the increasing traffic. The railroad formerly crossed the river on a long pile bridge, but a few years ago the larger part of the pile structure was filled solid, leaving an opening between the abutments of about 175 feet. This created so strong a current under the bridge that it was found necessary to riprap the bottom around the piles to protect it from scour. If the channel is improved as projected, it would probably be necessary to reconstruct the railroad bridge; and when this is done, the bottom under the fixed portion of the bridge should be excavated as well as the draw-way, in order to reduce the velocity of the current under the bridge.

Presumably the retaining walls on the sides of the present channel of the cut and under the highway bridge are laid on the sand and gravel bottom at about the level of low tide. If the 6-foot channel is excavated, it will be necessary to riprap the slopes of the cut in front of the wall on the westerly side, or possibly remove the wall, in which case the stones can be used to riprap the face of the sloping bank as left by the excavation. On the easterly side the wall will have to be wholly removed, and the stones forming this wall can be used in riprapping the face of the sloping bank as left by the excavation on that side. When the bridge is rebuilt, it should have a draw opening of not less than 40 feet.

No estimate of the cost of any changes in the railroad bridge or the city bridge has been made.

From the borings which were taken along the line of the

present cut and its approaches, and at points where from the surroundings ledge might be looked for, it appears that the excavation will be almost entirely in sand and gravel, with very little probability of striking any ledge.

In the section of the river where the proposed channel is to be excavated there are large areas of flats and marsh lying between the proposed channel and the high-water line; and it would seem that, as the material to be excavated is principally clean sand and gravel, it should be retained and used for filling these low areas. As the depth of the channel to be excavated is not great, it will be necessary to use small scows on the work, and these cannot be taken to sea in heavy weather; but if arrangements can be made for utilizing these flats, all the material to be excavated can be placed there without detriment to the river, and to the great advantage of the property. A portion of this material will undoubtedly have to be rehandled in order to place it in a compact manner, and this is allowed for in the estimate of cost of the work, assuming that no charge would be made by the owners of the flats. If the material through the cut or canal can be excavated by long boom clam shell dredges, it might be deposited on the banks of the canal, and if this can be done, the cost of the work may be considerably reduced.

The cost of excavating the channel as above outlined and riprapping the banks in the cut under the highway bridge would be as follows:—

	Cubic Yards.
Excavation from Wolf Hill to railroad	
bridge,	59,400
Through railroad bridge,	6,000
From railroad bridge to Gloucester harbor,	122,300
	<hr/>
	187,700 at 35 cents, \$65,695
Removing wall and riprapping bank on westerly side of cut,	900
Removing wall and riprapping bank on easterly side of cut,	1,700
	<hr/>
	\$68,295
Supervision and contingent expenses, 10 per cent.,	6,829
	<hr/>
	\$75,124

The amount expended from the appropriation is \$1,399.28.

The Board does not deem the advantages to the public to be commensurate with the cost of the improvement.

CONNECTICUT RIVER.

In December, 1902, the Board was informed that solid material was being dumped into the Connecticut River below high-water mark from the premises of manufacturing companies in Holyoke, in violation of chapter 96 of the Revised Laws; and the offending parties were notified to appear before the Board and show cause why the Attorney-General should not be directed to institute proceedings for creating a nuisance, in violation of statute. Subsequently proceedings were instituted by the Attorney-General, with the result that later an adjustment was effected.

In the spring of 1903 willow cuttings were set in the easterly bank just below the highway bridge between Hadley and Northampton, where it had been ripped in front of the dike built the previous year. The expense was \$92.71.

After the spring freshets it was found that a section about 50 feet long in the protective works built at Hadley in 1889 needed repair, and also that in several places in the work done in 1900, at the foot of the graded bank, the riprap had been somewhat damaged. These places are being repaired by placing willow mats and stone riprap over the damaged areas, and planting large willow sticks or cuttings. The cost of the above work to Dec. 1, 1903, is \$1,112.51. The total amount expended at Hadley, up to Dec. 1, 1903, is \$57,909.80.

By chapter 82 of the Resolves of 1903 the Board was authorized to expend \$7,500 in protecting the westerly bank of the river in the town of Hatfield from further encroachment. In August an inspection of the locality was made, and conference held with the selectmen and owners of property along the river bank. It was found that protection by riprapping the banks as at Hadley was desired; but as the amount of money available was insufficient, it was decided, after an examination and discussion, to construct a dike running from the highway across the depression in the

meadows which runs along just back of the present highway in Hatfield, to the higher portions of the river bank and thence along the bank for a short distance, for the purpose of preventing the river from breaking through this depression, thereby cutting off a large section of the meadows and forming an island. This would effectually prevent the river from breaking through as feared, and could be done within the appropriation. Releases have been obtained from the owners of property on which the dike is to be located, for all claims for damages which may arise from its construction; but, owing to delays in getting these releases, it was decided to postpone construction until next spring.

The sum of \$165.10 has been expended in the preliminary work, from the appropriation of \$7,500.

In September an inspection was made of the manner in which the Turners Falls Lumber Company was using its privilege under a license from the Board for maintaining booms at Turners Falls, complaint having been made that at times this company did not afford sufficient passageway through the boom for river craft.

HARBOR OF REFUGE, QUICKS HOLE.

In pursuance of the requirements of chapter 25 of the Resolves of 1903, a preliminary examination was made in July as to the expediency of constructing a harbor of refuge for fishing boats and small yachts on the westerly side of Quicks Hole in the town of Gosnold, "by excavating a channel into the pond at the north-easterly end of Nashawena Island."

There are two ponds located at the north-easterly end of this island, with a swamp or marshy area lying between them. The most westerly one, having an area of about 25 acres as measured on the United States Coast Survey chart, is nearly surrounded by hills and sand dunes, and would form a well-protected harbor. The shortest distance between the pond and Quicks Hole is about 300 feet, a high sand dune separating the two bodies of water. The surface of the pond is at substantially the same elevation as high water in the Hole, and the depth of water in the pond does not

exceed $4\frac{1}{2}$ to 5 feet. The mean rise and fall of the tide at this point is about 3.7 feet, and if a cut suitable for the passage of boats should be made from the pond into the Hole, the pond would be drained nearly dry at low tide.

The easterly pond, having an area of about 45 acres as measured on the United States Coast Survey chart, is separated from the Hole by a narrow gravel bank, which would not offer as great a protection to boats anchored within it as the sand dunes and hills surrounding the westerly pond. The surface of the water in this pond is at practically the same elevation as in the westerly pond, but the depth of water is a few inches greater; however, if a cut should be made into this pond suitable for the passage of boats, it also would be practically drained dry at low tide.

In view of the above facts, it would be necessary to excavate the entire area which is required for an anchorage basin and make the necessary entrance from the Hole into the pond, in order to provide a harbor of refuge in this locality for fishing boats.

From these ascertained facts it was not deemed expedient either to make a survey, or an estimate of the cost of a harbor of refuge at this place.

No expenditure was made from the appropriation of \$500 allowed by the above resolve.

STAGE HARBOR.

By chapter 47 of the Resolves of 1903 the Board was authorized to build structures in the breach at the eastern end of Stage harbor in Chatham for the protection of the harbor from encroachments or damage by the sea, and for that purpose the sum of \$5,000 was appropriated. An examination and survey was made of the locality early in May, and it was found that a channel had been cut by the sea across the marsh, so that the flood current from the sea flowed through the breach into the eastern end of the harbor, and was washing into it large quantities of sand, and filling that portion of it.

Owing to the difference of time and elevation of high tide in the sea to the eastward of Chatham and in Stage har-

bor, the current flows almost continuously from the sea into the harbor. At the eastern end of the cut the channel is practically bare at low water, and is used as a ford by people passing to and from Monomoy Island.

Plans were prepared and proposals invited for the construction of a timber dike extending from the sand dunes on the northerly side of the breach to the dunes on the southerly side, and also for building lighter timber structures to close three gaps which extended through the sand dunes on the southerly side of the breach down to the level of the marsh. But one proposal was received, and that being 50 per cent. greater than the appropriation, it was rejected.

The total amount expended up to Dec. 1, 1903, is \$117.69.

APPONAGANSETT HARBOR.

The work of constructing the breakwater at the mouth of Apponagansett harbor, as authorized by chapter 509 of the Acts of 1902, under contract with E. S. Belden & Sons, has been completed. The breakwater is 690 feet long, and protects a large area of the harbor, making a much safer anchorage for yachts and other small craft. In all, 27,238 tons of stone were placed in the breakwater.

After examining the rocks which were reported as obstructions in various portions of the harbor, it was finally decided that, as they appeared to be of large dimensions and would probably be very expensive to remove, it would be better to mark the most dangerous one by an iron spindle, which was furnished and erected at an expense of \$447.50. Two other dangerous rocks are marked by a government buoy.

The use of the harbor has increased, and in the heavy gales of this year its efficiency and value as a shelter has been proved.

The total amount appropriated for this improvement is \$30,500. The amount expended up to Dec. 1, 1903, is \$30,331.82.

NANTUCKET HARBOR.

On May 14, 1903, an arrangement was made with George W. Townsend to remove certain rocks in Nantucket harbor, in accordance with a request made in the previous year by

the selectmen. Three large rocks were blown up, and the pieces taken for use in the government breakwater. One lay nearly in the middle and two near the side of the channel. The amount of work was found to be much larger than anticipated from representations made by the petitioners. In all, 100 tons of rock were broken up and deposited on the shore at Coatue Point, at an expense of \$1,043.50.

SCITUATE.

Under authority of chapter 434 of the Acts of 1900, for the protection of the shores and harbor of Scituate which were damaged by the sea, walls of concrete were constructed at the Sand Hills on the northerly side of Scituate harbor in 1900, and in 1902 along the crest of the beach lying between Damon's Island and the Glades at North Scituate. They satisfactorily answer the purpose for which they were intended.

On March 10, 1903, the selectmen called attention to the condition of the beach and highway between the first and second cliffs on the southerly side of Scituate harbor, and asked that a wall be built along the crest of that beach, to protect the highway in its rear. In May the Board made an examination, and in August a survey of the locality and estimate of cost of the proposed wall. In September the selectmen were informed that the estimated cost of the wall would be \$6,050, while the balance of the appropriation of \$15,000 made by the act was only \$2,810.97: and that, whenever the town would provide the balance necessary to complete the work, the Board would be ready to undertake it. A copy of a vote passed by the town Oct. 30, 1903, appropriating \$3,239.03 towards defraying the cost of building the desired wall, has recently been received.

The total amount expended at Scituate since the passage of chapter 434 of the Acts of 1900, is \$12,243.16.

EAST BAY, OSTERVILLE.

The project of opening a new channel for the passage of vessels from Nantucket or Vineyard Sound into East Bay at Osterville in the town of Barnstable, under chapter 96 of the Resolves of 1899, was investigated by the Board,

and a report made to the Legislature that the project was feasible, but that the opening should be protected by jetties in order to maintain the channel at the desired depth, and that the least cost would be \$42,500. This was deemed prohibitory of the enterprise.

By chapter 102 of the Resolves of 1901 the Board was required to make further examination, with a view to diminishing the cost of the project.

It reported that no substantial diminution of cost could be expected without materially changing the character and dimensions of the proposed entrance.

By chapter 376 of the Acts of 1903 the Board was authorized to construct an entrance into East Bay, and the sum of \$6,500 was appropriated to defray the expense thereof. Early in August, in pursuance of the act of 1903, an examination was made by the engineer, and it was found that the outer beach had washed away to a considerable extent, and the main outlet had moved about 1,200 feet to the westward. The tidal currents at the present time are maintaining a channel through the inner portion of the beach approximately 200 feet wide between the high-water lines, and 3 to 4 feet deep through the middle, except at the bend, where it is somewhat deeper. The best location for a navigable entrance was found to be in the same place as reported in 1899. With the appropriation available it is utterly impossible to make a channel of the dimensions originally planned. All that can be hoped for is to make a shallow cut and build short jetties on either side of the outer end sufficient to prevent the sand on the upper portion of the shore from washing into the cut, and to riprap the banks of the cut to such an extent as would force the current to scour out the bottom of the channel, and prevent it from washing away the banks.

A plan for a new entrance was made, which provides for excavating a channel through the upper portion of the beach down to low-water mark, riprapping the sides of this channel with stone largely obtained from the adjacent beaches, and building two short stone jetties on the outer beach to protect the entrance, relying on the current due to

the ebb and flood tides to scour out the channel to a greater depth.

In addition to the foregoing, it will be necessary to close the existing outlet artificially by building a dike or dam across it. The Board decided that it would not be advisable to attempt the work unless all the money available could be applied to opening the new cut and building the protecting jetties and riprap. After consulting with the parties interested in the improvement, they were informed that, if the expense of closing the old outlet in a manner satisfactory to the Board were not to be a charge upon the Commonwealth, it might be advisable to proceed with the work. Subsequently assurances were received from local contractors that they would undertake the work of constructing the new outlet and also closing the old one for the appropriation. Before contracting for the work, the Board requested the owners of the beach to release to it any claim for damages arising from the construction of the new outlet at the proposed location. Upon receipt of the desired releases immediate action will be taken in furtherance of the project.

WEST BAY, OSTERVILLE.

The work of excavating a channel through West Bay, at Osterville, under authority of chapter 491 of the Acts of 1902, has been satisfactorily completed. In all, 22,077 cubic yards of material have been excavated, under contract with John H. Gerrish, dated Aug. 8, 1902, at an expense of \$7,064.64.

The channel from the jetties to the deep water of the bay has now a width of not less than 100 feet, and through the higher portion of the shoal of 150 feet, with a depth of not less than 4 feet at mean low water throughout. The jetties are in a fair state of repair, but, owing to the eating of the planks by worms, some were broken off by the sea and had to be replaced.

The total amount expended at West Bay up to Dec. 1, 1903, is \$28,626.95.

LAKE ANTHONY.

The only work done at Lake Anthony in Cottage City during the year was the removal of a large boulder just beyond the outer end of the wharf on the north-western side of the lake. This was accomplished on June 9 and 10, at an expense of \$204.01.

The harbor master, without expense to the Commonwealth, took up, painted and replaced during the year all the buoys which had been set for moorings, and they are now in good condition. He estimates that an average of 75 yachts daily entered and cleared this harbor in July and August last, not including, however, about 25 yachts which made a home port there, many of which during the autumn were engaged in mackerel fishing.

The total amount expended at Lake Anthony up to Dec. 1, 1903, is \$26,836.28.

MENAMSHA INLET.

Early in June an examination and survey was made of the channel and jetties at Menamsha Inlet on the boundary line between Gay Head and Chilmark. But little change had taken place in the channel, as the work done during the previous year on the western jetty had effectually stopped the washing of sand through it, except at two small holes, which have since been stopped with pebbles and gravel.

Chapter 394 of the Acts of 1903 appropriated \$10,000 for straightening the channel above the jetties by dredging a new one across the flats up as far as the old stone wharf at the foot of the road leading to Vineyard Haven. Plans and estimates for this work were prepared, and on July 28, 1903, a contract was entered into with John H. Gerrish for dredging the channel 75 feet wide on the bottom, 5 feet deep at mean low water and about 1,600 feet long from the sound between the jetties and across the flats to the present channel opposite the old wharf, for the sum of \$8,250, the material to be placed on the banks well back from the sides of the excavation. This work was satisfactorily completed Oct. 12, 1903.

In order to prevent the current from cutting away the banks of the new channel at the turn near the old wharf, and the waves from washing down the banks just above the jetties, about 700 tons of stone were purchased and placed as riprap to protect the banks at these places. The stone was furnished by Daniel H. Flanders at \$1.10 per ton, delivered on the bank of the creek near the old wharf. The work of placing it along the banks of the channel was done by day labor. In addition to this, a timber fence about 80 feet long was built along the crest of the beach to close the gap in the wing of the eastern jetty, which was broken through by the sea three years ago. This fence was built to hold the crest of the beach in its present position by preventing the sea from pushing it over further inland. The total cost of this work amounts to \$1,673.42.

It is still unsettled what shape the excavated channel will finally take, for the waves during each high wind are washing down the banks, and the current flowing out from Menamsha Pond is carrying down considerable quantities of sand from the flats lying between the pond and the head of the channel.

The channel in its present condition forms a safe refuge for fishing boats and yachts, and already large numbers have made it a harbor over night while engaged in fishing in the sound near by. An account has been kept by the inspector on the work since September 24, giving the number of boats which came into the inlet for a harbor each night, the average in 44 days being 14 boats a day; on October 15, however, as many as 45 sought anchorage there. During this time two storms occurred, which prevented the boats from going out for a number of days, the duration of these storms being from October 9 to 13 inclusive, and from November 5 to 6.

The total amount expended at Menamsha Inlet up to Dec. 1, 1903, is \$17,739.18.

BASS RIVER AT SOUTH YARMOUTH.

Early in the spring a survey was made of the mouth of Bass River at South Yarmouth, to determine what changes had taken place since the construction of the jetties and

excavation of a portion of the outlet made the previous year, under the provisions of chapter 113 of the Resolves of 1901. The jetties were constructed of oak piles and spruce timber, and it was found that the sea worms already had attacked the spruce sheet piling, so that it was necessary at once to provide some method of protecting it from further injury. The current in the river had scoured and enlarged the channel which had been excavated, and its location at the same time had somewhat changed. On the whole, the channel was in a better navigable condition than when it was left on the completion of the work in the fall.

By reason of the insufficiency of the appropriation made in 1901, the Board was unable to excavate the channel the whole distance across the flats at the entrance to the river. By chapter 46 of the Resolves of 1903 an additional appropriation of \$15,000 was granted, to complete the improvement of the channel of the river.

Plans were prepared for excavating a channel 100 feet wide on the bottom through the flats from the deep water between the jetties to the deep water in the sound, a distance of about 1,700 feet. It was planned to have the excavated material removed and deposited in deep water about 1 mile south of the mouth of the river: but no proposals were received in response to the advertisements of the Board. Subsequently, a contract was entered into with John H. Gerrish to excavate the channel and deposit the material on the banks at a considerable distance back from the sides of the channel for the sum of \$6,500. From observations made since the completion of the work, there promises to be a good permanent channel of approach across the flats.

For the purpose of protecting the sheet piling of the jetties from just above low-water mark down to the sand, or, in cases where the water was very deep alongside the jetties, to a depth of 3 to 4 feet below low water, a protective covering of 1-inch boards, which had been previously treated with creosote in the proportions of 10 pounds to the cubic foot, were spiked to the sheet piling. Between the sheet piling and the boards there was placed a layer of tar paper,

to more effectually prevent worms from attacking the piles. Where the water was very deep alongside the jetty, bags filled with sand were deposited to form a bank close to the timber work. These sand banks were brought up to meet and lap on to the creosoted boards, so that now the whole length of both jetties, comprising about $\frac{3}{4}$ of a mile, is protected from the action of worms.

The cost of the work done during the year, including the survey made in the spring, amounts to \$8,186. The total amount expended in improving the entrance to Bass River up to Dec. 1, 1903, is \$31,292.86.

BASS RIVER, BEVERLY.

By chapter 341 of the Acts of 1903 the Board was directed to dredge a channel in Bass River at Beverly from Danvers River to a point near Elliott Street, — a distance of considerably over a mile, — 18 feet deep at mean high water, and 100 feet wide wherever practicable. An appropriation of \$25,000 was made by the Commonwealth for doing the work, the statute providing that any greater expense incurred shall be paid by the city of Beverly.

In June and August a survey of the river was made, and borings taken to determine the location and extent of the ledges which projected above the grade of the proposed channel, and estimates made of the cost of the work.

The existing low-water channel is quite tortuous, but in order to reduce the expense the proposed channel has been located as nearly as possible on its present line, departing from it only so much as is necessary to give a reasonably straight course through which large vessels can be safely navigated.

There does not appear to be any rock which will interfere with the excavation of the channel except at one point, where for a distance of about 150 feet a ledge crosses it, and projects from 1 to 6 feet above the proposed bottom.

The project contemplates a channel 100 feet wide on the bottom throughout, and 9 feet deep at mean low water, being equivalent to 18 feet deep at mean high water. Through the rock section it is proposed to reduce the width to 75 feet.

The location of the channel has been determined, and the cost of the work estimated at about \$85,000. The excess above the \$25,000 appropriated by the Legislature is to be paid by the city of Beverly. Plans and estimates were submitted to the mayor, and arrangements under the provisions of section 5 of the act made, whereby the city treasurer will promptly honor the requisitions of the Board for sums as needed.

Specifications have been prepared for publication, and proposals will be received Dec. 24, 1903.

The total amount expended up to Dec. 1, 1903, is \$618.75.

ISLANDS IN GREAT PONDS.

As the tendency of the urban population to find summer homes in the country increases, so hitherto unknown and comparatively worthless real estate becomes valuable.

To that description may be referred some of the islands in great ponds of the Commonwealth, of which the ownership is uncertain. Several of these were occupied by squatters, claiming title and denying the ownership of the Commonwealth. In a number of instances suits have been brought by the Attorney-General, at the request of the Board, the results of which will doubtless appear in his report.

On petition of Lyman R. Eddy, filed Aug. 19, 1902, for registration of title to Goat Island in Lake Chargoggagoggmanchaugagoggagungamaug, a great pond in the town of Webster, a good title was found by the court in the petitioner, and, on Feb. 17, 1903, a decree for registration ordered subject to any existing public rights between high and low water mark.

Under our form of government, while all private property is held subject to be taken whenever the public welfare so demands, all real estate should be open to private purchase and occupancy except such as is reserved for special purpose or public use. When reserved for public use, it should be so cared for as to prevent its becoming a nuisance.

Would it not be well for such islands as belong to the Commonwealth, because of no record of grant either to individuals or to the township in which they are located, and

for which no public use has arisen, to be open to the occupation and enjoyment or acquisition of those having need therefor, and be disposed of by lease or sale? There seems to be no sufficient reason for suggesting leasing the islands except possibly in some rare and special instances.

In the case of Grape Island in Lake Winthrop in Holliston, application was made by certain individuals to lease it. Upon investigation, it was learned that the use to be made was likely to prove a nuisance. Leasing to the individuals was objected to by the cemetery association which held property on the adjacent mainland, and by the selectmen of the town, who requested that, if leased at all, it should be to the cemetery association. This request seemed to be in the interest of quiet and good behavior, and the Board granted a license to the cemetery association to control and occupy this island, terminable at will.

Another unused land interest has arisen the past year, which it seems to be the duty of this Board to care for. On the decease of Franklin H. Bishop of Russell, and proof of his will in the probate court for Hampden County, it appears that he gave to the Commonwealth about \$10,000 worth of personal estate, and two certain parcels of land in the town of Russell, bordering on Russell Pond and comprising 2 acres, more or less, appraised at \$50. Application has been made to purchase these lots, but the Board is in doubt as to its right to dispose of them without the authority of the Legislature.

PROVINCE LANDS.

The work of transplanting grass, shrubs and trees, and the planting of pine seed, has been carried on during the past year on the Province Lands much in the same manner as heretofore.

The weather conditions during the summer were unusually poor, owing to the prevalence of a serious drought. As, however, most of the transplanting has been done since the middle of September, it is to be hoped that the work will not suffer. In all, about 25 acres were covered by the transplanting.

The result of the work of previous years shows gradual and decided improvement, the young pines and other trees, as well as the shrubs, exhibiting a vigorous and healthy growth.

The method adopted for the improvement of these lands has recently been confirmed by the report of a gentleman in high authority on the subject, as to similar works of reclamation carried on in Europe for more than half a century on substantially the same lines, where similar results have been reached. This confirmation encourages a belief that the improvement made is of the right character, and will be permanent.

The report * of the superintendent of these lands may be found in the Appendix. The amount received during the year for the use of portions of these lands is \$78.02.

The total amount expended by the Commonwealth on the Province Lands up to Dec. 1, 1903, is \$31,628.08.

TOWN BOUNDARY SURVEY.

The work of determining the location of town boundaries has continued with the same organization as for the past few years. Two field parties were employed during the working season from the first of April to the last of November. These parties have made the necessary surveys and obtained the information required in 58 cities and towns, located in Essex, Middlesex, Bristol and Worcester counties. A portion of the work accomplished was the survey of about 56 miles of roads and streams, forming boundaries between the various cities and towns.

In addition to the field work, the notes of surveys made in the previous year have been plotted, and the information procured has been put in proper shape for future record.

During the year atlases have been published covering the boundaries of 11 cities and towns, to wit, Boston, Brookline, Avon, Braintree, Canton, Holbrook, Hyde Park, Milton, Quincy, Randolph and Stoughton; and another atlas, covering 7 cities and towns, to wit, Belmont, Burlington,

* See Appendix C.

Cambridge, Lexington, Somerville, Waltham and Watertown, is now in the hands of the printer. One covering 6 cities and towns, to wit, Dedham, Dover, Needham, Newton, Wellesley and Westwood, has been prepared for the printer, and can be sent to him as soon as final action is taken on the straightening of one boundary line. Another atlas, covering 8 towns, to wit, Acton, Bedford, Concord, Lincoln, Maynard, Sudbury, Wayland and Weston, is in readiness for publication.

The plan of a portion of the boundary line between the towns of Braintree and Holbrook has been filed with the secretary of the Commonwealth, as required by chapter 149 of the Acts of 1903.

All the corners in the new town boundary lines established by the Legislature at its last session have been located, and the necessary stone monuments set by the town authorities to permanently mark the same.

During the year, after consulting with the town authorities, the Board submitted to 12 different towns, to wit, Boxford, North Andover, North Reading, Groveland, Middleton, Rowley, Ipswich, Hamilton, Andover, Essex, Newbury and West Newbury, for their concurrence, plans showing changes for straightening portions of the boundary lines. In most of these cases doubt existed as to the exact location of these lines, and some of the proposed changes are made in order that the lines may be properly defined and marked. After action by the towns in relation to the changes aforesaid the matter will be submitted to the Legislature in accordance with section 7 of chapter 25 of the Revised Laws.

The work of compiling the statutes relating to the establishment of the several town boundaries has been continued by the clerical force. Since the last report the court records from the year 1703 to 1765 have been examined, and all descriptions of town lines found therein have been copied for use in the preparation of the town boundary atlases.

In the preparation of atlases various improvements in the method of arranging information have been made, by which the cost has been somewhat reduced.

At the end of the season of 1903 the field work had been

substantially completed in that portion of the State east of Worcester County, except Barnstable and Dukes counties and two towns on the western border of Middlesex County; and the data relating to the boundaries of 71 of the 167 towns and cities within this area had been published.

SALE AND DISPOSITION OF MASSACHUSETTS ATLAS SHEETS AND TOWN BOUNDARY ATLASES.

There has been paid into the treasury of the Commonwealth during the year, under authority of chapter 57 of the Resolves of 1890 and chapter 360 of the Acts of 1900, the sum of \$175.35 received from the sale of Massachusetts atlas sheets and town boundary atlases. Under chapter 360 of the Acts of 1900 thirty-six town boundary atlases have been sent to the officers of the various cities and towns. Under chapter 95 of the Resolves of 1891 four topographical atlases have been gratuitously distributed.

WRECKS.

Complaints regarding wrecks have been received by the Board as follows:—

A scow adrift in Witchmere harbor, in Harwichport.

The schooner “D. Gifford” sunk at the entrance to Pigeon Cove harbor, in Rockport.

The barge “Keystone” lying sunken in Boston harbor, on the south-easterly side of Spectacle Island.

After examining the wrecks and notifying the owners, they were removed to places where they would cause no further obstruction.

The Board requested the United States authorities to remove the schooner “Charles W. Parker,” wrecked in Boston harbor by collision.

No expenditure has been made during the year from the annual appropriation for the removal of wrecks.

INSPECTIONS MADE BY THE BOARD DURING THE YEAR.

1902.

- Dec. 29. Portion of South Bay near the New England Railroad bridge, where material was dumped.
- Dec. 30. Sea walls built by the Commonwealth at North Scituate, and at Stony Beach in Hull.

1903.

- Jan. 5. Wharf of Boston Tow Boat Company in East Boston, relative to removal of the portion built beyond the harbor line.
- Jan. 9. Wharves of Messrs. Richards, Stone and others on Mystic River.
- Jan. 28. Wreck of schooner "D. Gifford" at entrance to Pigeon Cove harbor, in Rockport; wharf of Littlefield & Plummer in Lynn harbor.
- Feb. 3. Wharves of Messrs. Stone and Richards on Mystic River.
- Feb. 10. Work in progress on the Commonwealth's flats at South Boston, and improvements made in South Bay.
- Feb. 11. Work done on jetties and channel in Bass River at South Yarmouth.
- Mar. 2. Wharves of Messrs. Stone and Richards on Mystic River.
- Mar. 9-11. Jetties at Witchmere harbor in Harwich; mouth of Herring River; jetties and channel in Bass River; East Bay in Osterville; Stage Harbor in Chatham, — in company with legislative committee.
- Mar. 26. Bass River in Beverly, in company with legislative committee.
- Mar. 27. Work in progress on the Commonwealth's flats at South Boston.
- Apr. 13. Dredging of channel in West Bay at Osterville.
- Apr. 14. Jetties and channel in Bass River at South Yarmouth.
- Apr. 23. Site of proposed work of the United Shoe Machinery Company on Bass River in Beverly.
- Apr. 24. Work of survey of Bass River at South Yarmouth.
- Apr. 25. Channel in West Bay at Osterville.
- Apr. 27-28. Work of survey at Stage harbor in Chatham, relative to protective work authorized by chapter 47 of the Resolves of 1903.

1903.

- Apr. 29. Work in progress on the Commonwealth's flats at South Boston.
- May 9. Work done on breakwater in Apponagansett harbor at South Dartmouth.
- May 15. Wharf of the Condor Iron Foundry Company on Chelsea Creek in East Boston.
- May 18. Wharf of the United States Baking Company on Mystic River.
- May 21. Beach between the first and second cliffs in Scituate, relative to further work under appropriation by the Legislature.
- May 22-25. Removal of rocks from Nantucket harbor.
- June 1. Wharf in Lynx harbor adjoining property of People's Coal Company.
- June 1-3. Work done at Menamsha and Lake Anthony.
- June 12. Site of proposed work of the Old Colony Street Railway Company and Jerome C. Borden on Taunton River in Fall River.
- June 19-20. Channel in West Bay at Osterville, and jetties in Bass River at South Yarmouth.
- June 23. Site of proposed work of the Crystal Springs Ice Company on Merrimac River in West Newbury.
- June 26. Work in progress on the Commonwealth's flats at South Boston.
- June 27. Sea walls built by the Commonwealth at North Scituate and at Stony Beach in Hull.
- July 8. Annisquam River in Gloucester, relative to survey authorized by chapter 71 of the Resolves of 1903.
- July 9. Work in progress on the Province Lands in Provincetown.
- July 10. Site of protective work in Stage harbor at Chatham ; East Bay and channel leading from mouth of Centreville River at Osterville, relative to channel authorized by chapter 376 of the Acts of 1903.
- July 11. Work in progress on Bass River at South Yarmouth.
- July 16. Ipswich and Plum Island rivers.
- July 23. Breakwater in Apponagansett harbor ; ponds at the north-easterly end of Nashawena Island relative to a harbor of refuge on the westerly side of Quicks Hole, under authority of chapter 25 of the Resolves of 1903 ; work done at Menamsha ; harbor and jetties at Lake Anthony.

1903.

- Aug. 3-5. Work in progress on Bass River at South Yarmouth, and in West Bay at Osterville.
- Aug. 7. Bank of the Connecticut River in Hatfield, relative to work authorized by chapter 82 of the Resolves of 1903 ; work done in North Hadley.
- Aug. 8. Wrecked barge "Keystone" in Boston harbor near Spectacle Island.
- Aug. 10. Work in progress on survey of Annisquam River.
- Aug. 11-12. East Bay at Osterville.
- Aug. 13. Work in progress on Bass River at South Yarmouth.
- Aug. 15. Work in progress on survey of Annisquam River.
- Aug. 20. Work of making borings in Bass River at Beverly, relative to dredging authorized by chapter 341 of the Acts of 1903.
- Aug. 21. Work in progress on Bass River at South Yarmouth.
- Aug. 22. Work in progress on the Province Lands in Provincetown.
- Aug. 27-28. Work of dredging outlet from Menamsha Pond, authorized by chapter 394 of the Acts of 1903.
- Aug. 31. Work in progress on Bass River at South Yarmouth.
- Sept. 4. Work in progress on survey of Annisquam River ; site of proposed work of the Holyoke Water Power Company on Connecticut River in Holyoke ; boom of the Turners Falls Lumber Company at Turners Falls.
- Sept. 8. John's Pond in Carver, relative to petition for license to draw water from this pond for flowing cranberry bogs.
- Sept. 10-11. Work in progress at West Bay in Osterville and on Bass River at South Yarmouth ; work in progress on the Commonwealth's flats at South Boston.
- Sept. 17. Sites suggested for location of new drawbridge over Taunton Great River, authorized by chapter 462 of the Acts of 1903.
- Sept. 18. Town boundary survey work at Dunstable.
- Sept. 24-25. Work in progress at West Bay in Osterville and on Bass River at South Yarmouth.
- Oct. 1-2. Work in progress at Menamsha.
- Oct. 8-15. Work in progress at Menamsha.
- Oct. 16. South Bay and Commonwealth's flats at South Boston.
- Oct. 17. Site of proposed wharf of the Fall River Gas Works Company in Mount Hope Bay, Fall River.

1903.

- Oct. 22. Work done on jetties at South Yarmouth.
 Oct. 23-24. Piers and docks in New York city.
 Oct. 28-29. Protective work on Connecticut River in Hadley.
 Nov. 3. Wharf of H. Frances Dunning on Mystic River in
 Somerville; site of proposed work in Manchester
 harbor.

LICENSES GRANTED DURING THE YEAR.

Nos.

2688. Petition of the Boston & Northern Street Railway Company
 for license to dump snow and ice into Mystic River from
 Chelsea bridge. Granted Dec. 16, 1902.
 2689. Petition of the Nantasket Beach Steamboat Company for
 license to rebuild its wharf and build additions thereto,
 on piles, on Weir River, in Hull. Granted Dec. 18,
 1902.
 2690. Petition of James Millar & Co. for license to build a bulk-
 head and fill solid in a dock in Plymouth harbor, in
 Plymouth. Granted Dec. 18, 1902.
 2691. Petition of Ellis W. Harlow for license to build a bulkhead
 and fill solid in a dock in Plymouth harbor, in Plymouth.
 Granted Dec. 18, 1902.
 2692. Petition of the city of Boston for license to repair its wharf
 and build an addition thereto, on piles, at Rainsford
 Island, in Boston harbor. Granted Dec. 18, 1902.
 2693. Petition of the city of Boston for license to repair the
 steamboat wharf at Deer Island, in Boston harbor.
 Granted Dec. 18, 1902.
 2694. Petition of the American Linen Company for license to
 build a sea wall and fill solid on Taunton River, in Fall
 River. Granted Dec. 18, 1902.
 2695. Petition of the Fall River Iron Works Company for license
 to build a sea wall and fill solid on Taunton River, in
 Fall River. Granted Dec. 18, 1902.
 2696. Petition of Robert D. Evans for license to build a sea wall
 and fill solid at Beverly Cove, in Beverly. Granted Jan.
 2, 1903.
 2697. Petition of Henry W. Smith and Edwin G. Smith for license
 to build a pile and timber boom on Chelsea Creek, in
 Chelsea. Granted Jan. 2, 1903.
 2698. Petition of Mary M. Gately for license to build a bulkhead
 and pile platform, and fill solid, in South Bay, in Boston.
 Granted Jan. 5, 1903.

Nos.

2699. Petition of the Hamilton Woolen Company for license to build a pile wharf, pile fender and bulkhead, and to fill solid, on Powow River, in Amesbury. Granted Jan. 5, 1903.
2700. Petition of John Duff for license to extend his wharf, on piles, on Acushnet River at the westerly side of Fish Island, and to build a sea wall and fill solid in a dock on the south-easterly side of said island, in New Bedford. Granted Jan. 7, 1903.
2701. Petition of the Lynn Yacht Club for license to build a bulkhead and fill solid in Lynn harbor, in Lynn. Granted Jan. 7, 1903.
2702. Petition of Edward S. Tripp for license to build a bulkhead and fill solid in Lynn harbor, in Lynn. Granted Jan. 7, 1903.
2703. Petition of Nehemiah Lee for license to build a bulkhead and fill solid in Lynn harbor, in Lynn. Granted Jan. 7, 1903.
2704. Petition of Lester Leland for license to build and maintain a pier and float in Manchester harbor, in Manchester. Granted Jan. 9, 1903.
2705. Petition of the Northampton & Amherst Street Railway Company for license to lay a submarine cable across Connecticut River, in Hadley and Hatfield. Granted Jan. 28, 1903.
2706. Petition of the Standard Oil Company of New York for license to build bulkheads and pile platforms, fill solid and to dredge, on Chelsea Creek, at East Boston. Granted Jan. 28, 1903.
2707. Petition of Isaiah Spindell for license to build pile structures in Eel Pond, adjoining Water Street at Woods Hole, in Falmouth. Granted Jan. 30, 1903.
2708. Petition of the Hutchinson Lumber Company for license to build and maintain a wharf, in Lynn harbor, in Lynn. Granted Feb. 2, 1903.
2709. Petition of Joseph B. Breed and Henry W. Breed for license to build a bulkhead and pile platform, and fill solid, in Lynn harbor, in Lynn. Granted Feb. 2, 1903.
2710. Petition of Joanna R. Foster for license to build and maintain a pile platform at her wharf in Lynn harbor, in Lynn. Granted Feb. 2, 1903.
2711. Petition of the city of Boston for license to repair the piers at the East Boston landing of the north ferry, in Boston harbor. Granted Feb. 3, 1903.

Nos.

2712. Petition of the New England Railroad Company, the New York, New Haven & Hartford Railroad Company, lessee, for license to widen the pile platforms on the easterly and westerly sides of its pier No. 2, South Boston freight terminals, in Boston harbor. Granted Feb. 3, 1903.
2713. Petition of Lawler Bros. for license to fill solid, build a pile wharf and to dredge, on Chelsea Creek, in Chelsea. Granted Feb. 10, 1903.
2714. Petition of Otis Foss for license to build a pile wharf in Lake Anthony, in Cottage City. Granted Feb. 10, 1903.
2715. Petition of Charles H. Burns for license to build a bulkhead and fill solid on Mystic River, in Boston. Granted Feb. 18, 1903.
2716. Petition of John B. Bugbee for license to build a bulkhead and fill solid on Mystic River, in Boston. Granted Feb. 18, 1903.
2717. Petition of Francis W. Lawrence and Harry H. Wiggin for license to build a bulkhead and fill solid on Mystic River, in Boston. Granted Feb. 18, 1903.
2718. Petition of the Boston Tow Boat Company for license to extend its south wharf, on piles, in Boston harbor, at East Boston. Granted Feb. 18, 1903.
2719. Petition of the city of Boston for license to build a sea wall and fill solid on Roxbury Canal, in Boston. Granted Feb. 27, 1903.
2720. Petition of Albert Watts for license to build a bulkhead and jetties, and fill solid in Boston harbor, in Winthrop. Granted March 19, 1903.
2721. Petition of Jeremiah Green for license to build a bulkhead and pile wharf, to fill solid and dredge, on Belle Isle Inlet, in Winthrop. Granted March 19, 1903.
2722. Petition of the trustees of the Wing's Neck Trust for license to build a breakwater and pile pier in Wing's Cove, and a wharf in Pocasset harbor, at Wing's Neck, in Bourne. Granted March 19, 1903.
2723. Petition of Edward Canney for license to build a stone breakwater in Ipswich Bay at Lanesville, in Gloucester. Granted March 23, 1903.
2724. Petition of Hanora O'Riorden, Jeremiah P. O'Riorden, Agnes C. Taft, Garrett J. O'Riorden and Michael S. O'Riorden for license to build a bulkhead, fill solid and maintain certain filling, on Mystic River, in Boston. Granted March 30, 1903.

Nos.

2725. Petition of James W. Austin, trustee, for license to build and maintain a wharf and float in Marion harbor, in Marion. Granted March 30, 1903.
2726. Petition of the South Bay Improvement Company for license to fill solid and maintain certain filling in South Bay, in Boston. Granted April 6, 1903.
2727. Petition of the Boston, Revere Beach & Lynn Railroad Company for license to build a pile structure and dolphins, to fill solid and dredge, in Boston harbor, at East Boston. Granted April 15, 1903.
2728. Petition of James H. Strong and Bernard W. Isfort for license to build a pile pier and to dredge in Broad Sound, in Revere. Granted April 17, 1903.
2729. Petition of Edward G. Frothingham for license to extend a building over Little River, in Haverhill. Granted April 17, 1903.
2730. Petition of the city of Boston for license to build a drop and drive piles in the easterly wharf at Long Island, in Boston harbor. Granted April 17, 1903.
2731. Petition of the Point Shirley Club for license to build and maintain a pile wharf and float in Boston harbor at Point Shirley, in Winthrop. Granted April 17, 1903.
2732. Petition of the Board of Metropolitan Park Commissioners for approval of plans for building a pile bridge over Malden River, in Everett and Medford, under authority of chapter 288 of the Acts of 1894. Granted April 24, 1903.
2733. Petition of the Old Colony Street Railway Company for license to build a sea wall, pile wharf and suction crib, and fill solid, on Weymouth Fore River and Town River at Quincy Point, in Quincy. Granted April 28, 1903.
2734. Petition of Almira A. Young for license to build and maintain a pile pier and float in the Mill Pond, in Chatham. Granted April 28, 1903.
2735. Petition of Clarence H. Collins for license to build a pile pier in Edgartown harbor, in Edgartown. Granted April 28, 1903.
2736. Petition of Isaiah Spindell for license to widen a portion of Bar Neck wharf, on piles, in Great harbor at Woods Hole, in Falmouth. Granted April 28, 1903.
2737. Petition of Alfred C. Harrison for license to build and maintain a sea wall and marine railway, and fill solid, in Little harbor at Woods Hole, in Falmouth. Granted April 28, 1903.

Nos.

2738. Petition of Nicholas M. Sirovich for license to build a wharf in Hull Bay at Stony Beach, in Hull. Granted April 30, 1903.
2739. Petition of the United Shoe Machinery Company for license to build and maintain dams, and fill solid on Bass River, in Beverly. Granted May 6, 1903.
2740. Petition of the United Shoe Machinery Company for license to build a sea wall and fill solid on Bass River, in Beverly. Granted May 6, 1903.
2741. Petition of the city of Boston for license to build a bulkhead and pile platform, and fill solid, on the south channel of Mystic River, in Boston. Granted May 8, 1903.
2742. Petition of the Thomson-Houston Electric Company of Connecticut for license to widen its wharf, on piles, to lay and maintain pipes and fill solid on Saugus River, in Lynn. Granted May 13, 1903.
2743. Petition of Frederic L. Felton for license to fill solid and maintain certain filling in Boston harbor, near the Reserved Channel, at South Boston. Granted May 19, 1903.
2744. Petition of Delia P. Smith for license to build and maintain a wharf and float in Marion harbor, in Marion. Granted May 27, 1903.
2745. Petition of David P. Kimball and L. Cushing Kimball, trustees, for license to build a pile wharf in South Bay, in Boston. Granted June 9, 1903.
2746. Petition of Catherine A. Codman, Stephen R. H. Codman, Edmund D. Codman and Robert Codman, for license to build a pile wharf in South Bay, in Boston. Granted June 9, 1903.
2747. Petition of Alvarado A. Coburn for license to build a wharf in Lake Quinsigamond, in Worcester. Granted June 22, 1903.
2748. Petition of Hiram H. Ames for license to build a wharf in Lake Quinsigamond, in Worcester. Granted June 22, 1903.
2749. Petition of Charles F. Ward for license to lay a cable across a portion of Chatham harbor at Nauset Beach, in Chatham. Granted June 22, 1903.
2750. Petition of Paul Butler for license to extend his wharf, on piles, in Gloucester harbor, in Gloucester. Granted June 22, 1903.

Nos.

2751. Petition of Elwood G. Macomber, Isaac B. Macomber and Samuel Mercer for license to build a foot bridge, on piles, across a portion of Cole's River, in Swansea. Granted June 23, 1903.
2752. Petition of Eben D. Jordan for license to build and maintain a pier and float in Manchester harbor, in Manchester. Granted June 23, 1903.
2753. Petition of the Boston & Northern Street Railway Company for license to rebuild its wharf and extend the same, on piles, on Chelsea Creek, in Chelsea. Granted June 23, 1903.
2754. Petition of the Lynn Gas and Electric Company for license to build a sea wall and bulkhead, and fill solid, in Lynn harbor, in Lynn. Granted June 23, 1903.
2755. Petition of Charles C. Hanley for license to build a bulkhead, fill solid and dredge, on Town River, in Quincy. Granted June 24, 1903.
2756. Petition of Leonard Thompson for license to build a sea wall, construct a dolphin, fill solid and dredge, in Hingham harbor, in Hingham. Granted June 29, 1903.
2757. Petition of John Duff for license to extend his wharf, on piles, on Acushnet River, at the westerly side of Fish Island, in New Bedford. Granted June 29, 1903.
2758. Petition of John Duff for license to extend his wharf, on piles, on Acushnet River, at the easterly side of Fish Island, in New Bedford. Granted June 29, 1903.
2759. Petition of the city of Boston for license to drive piles and reconstruct its wharf on the southerly side of Gallop's Island, in Boston harbor. Granted June 30, 1903.
2760. Petition of Anna Bartlett Boynton and E. Moody Boynton for license to build an embankment, bulkheads, wharf and tide gates on Merrimac River, in West Newbury. Granted July 6, 1903.
2761. Petition of the city of New Bedford for license to build a pile and timber addition to its wharf on Acushnet River, at the foot of Union Street, in New Bedford. Granted July 8, 1903.
2762. Petition of Reed & Gamage for license to extend their wharf, on piles, in Gloucester harbor, in Gloucester. Granted July 8, 1903.
2763. Petition of the City Coal Company for license to widen its wharf by building a sea wall and filling solid on Acushnet River, in New Bedford. Granted July 8, 1903.

Nos.

2764. Petition of William F. Nye for license to extend his wharf, partly solid and partly on piles, on Acushnet River at Fish Island, in New Bedford. Granted July 13, 1903.
2765. Petition of the Metropolitan Water and Sewerage Board for approval of plans for laying two 36-inch sewer pipes across Mill Creek, in Chelsea and Revere, under authority of chapter 242 of the Acts of 1903. Granted July 14, 1903.
2766. Petition of the city of Taunton for license to rebuild the bridge and draw-pier on Taunton River at Plain Street, in Taunton. Granted July 15, 1903.
2767. Petition of the city of New Bedford for license to lay a 6-inch water pipe in Acushnet River from Fish Island to Pope's Island, in New Bedford. Granted July 16, 1903.
2768. Petition of the United Shoe Machinery Company for license to build and maintain a dam on Bass River, in Beverly. Granted July 20, 1903.
2769. Petition of the Edison Electric Illuminating Company of Boston for license to build structures, fill solid and dredge a channel in Boston harbor near the Reserved Channel, at South Boston. Granted July 20, 1903.
2770. Petition of George B. Holbrook for license to build a pile pier in Hyannis harbor at Hyannisport, in Barnstable. Granted July 20, 1903.
2771. Petition of Frederick Grinnell for license to build a pier, partly solid and partly on piles, and a stone breakwater, in Buzzards Bay, in Dartmouth. Granted July 20, 1903.
2772. Petition of the J. M. Guffey Petroleum Company for license to build a wharf and bulkhead, and fill solid, in Beverly harbor, in Beverly. Granted July 20, 1903.
2773. Petition of the Old Colony Street Railway Company for license to build a sea wall and fill solid in Mount Hope Bay, in Fall River. Granted July 29, 1903.
2774. Petition of Joseph W. Stickney for license to build a bulkhead and fill solid on Chelsea Creek, in Chelsea. Granted July 30, 1903.
2775. Petition of Augustus Hemenway for license to build and maintain a pile pier and float on Danvers River, in Beverly. Granted July 30, 1903.
2776. Petition of Joseph B. Dickson, Jesse L. Eddy and Dana B. Cutter for license to drive piles on Mystic River, in Somerville. Granted July 30, 1903.

Nos.

2777. Petition of the Duplessis Shoe Machinery Company for license to build a sea wall and fill solid on Merrimac River, in Haverhill. Granted July 31, 1903.
2778. Petition of the Holyoke Water Power Company for license to erect a power station and excavate a race-way on the Connecticut River, in Holyoke. Granted Sept. 11, 1903.
2779. Petition of the Whitman Mills for license to build a bulk-head and fill solid on Acushnet River, in New Bedford. Granted Sept. 11, 1903.
2780. Petition of the Massachusetts Pipe Line Gas Company for approval of plans for driving piles and laying a siphon in Chelsea Creek at Chelsea Street bridge, in Boston and Chelsea, under authority of chapter 537 of the Acts of 1896. Granted Sept. 16, 1903.
2781. Petition of Thomas E. Reed for license to build a pile wharf in Massachusetts Bay at Cape Hedge near the easterly end of Long Beach, in Rockport. Granted Sept. 18, 1903.
2782. Petition of the Squantum Yacht Club for license to build and maintain a pile wharf, two dolphins and floats in Quincy Bay, in Quincy. Granted Sept. 21, 1903.
2783. Petition of Sylvanus Smith for license to extend his wharf, on piles, in Gloucester harbor, in Gloucester. Granted Sept. 21, 1903.
2784. Petition of the Butchers Slaughtering and Melting Association for license to build a pile wharf on Charles River at Brighton, in Boston. Granted Sept. 22, 1903.
2785. Petition of the New England Pottery Company for license to maintain certain filling and build a pile wharf on Chelsea Creek, at East Boston. Granted Sept. 22, 1903.
2786. Petition of the Hartford & Worcester Street Railway Company for license to fill solid and construct an embankment in Wales Pond, in Wales. Granted Sept. 24, 1903.
2787. Petition of the Hartford & Worcester Street Railway Company for license to build a trestle and fill solid in Wales Pond, in Wales. Granted Sept. 24, 1903.
2788. Petition of the trustees of the White Head Association for license to build and maintain a pile wharf on Weir River, in Hull. Granted Sept. 24, 1903.
2789. Petition of Job Churchill for license to build a dike and flume and draw water from John's Pond, in Carver. Granted Sept. 24, 1903.

Nos.

2790. Petition of the Metropolitan Steamship Company for license to build a sea wall and pile structure in Boston harbor at Union wharf, in Boston. Granted Sept. 28, 1903.
2791. Petition of Harry E. Converse for license to extend his wharf, partly solid and partly on piles, and to dredge, in Marion harbor at Charles Neck, in Marion. Granted Sept. 29, 1903.
2792. Petition of the Standard Oil Company of New York for license to repair its wharf and build two dolphins on Merrimac River, in Salisbury. Granted Oct. 5, 1903.
2793. Petition of Paul R. Eames for license to build an addition to his wharf on Ipswich River, in Ipswich. Granted Oct. 5, 1903.
2794. Petition of the county commissioners of Essex County for approval of plans for relocating and reconstructing the present causeway across Waters River at Hussey's Mill, in Danvers, under authority of chapter 388 of the Acts of 1903. Granted Oct. 6, 1903.
2795. Petition of the city of Boston for license to build a bulkhead and fill solid in the south channel of Mystic River, in Boston. Granted Oct. 14, 1903.
2796. Petition of the John Morrison Company for license to repair its wharf, build a new wharf and to dredge, in Boston harbor, at East Boston. Granted Oct. 20, 1903.
2797. Petition of Everett Joy for license to build a bulkhead, pile platform and wharf, and fill solid in Lake Anthony, in Cottage City. Granted Oct. 27, 1903.
2798. Petition of the Fall River Gas Works Company for license to build a wharf in Mount Hope Bay, in Fall River. Granted Oct. 27, 1903.
2799. Petition of the Metropolitan Park Commissioners for license to fill solid on Charles River near North Harvard Street, in Boston. Granted Oct. 30, 1903.
2800. Petition of the New England Telephone and Telegraph Company of Massachusetts for license to lay and maintain a cable under and across the draw-way in Wellington bridge on Mystic River, in Somerville and Medford. Granted Oct. 30, 1903.
2801. Petition of Lewis & Lord for license to build timber boatways in Salem harbor at their wharf, in Salem. Granted Nov. 3, 1903.
2802. Petition of Francis W. Lawrence and Harry H. Wiggin for license to build a bulkhead and fill solid on Mystic River, in Boston. Granted Nov. 6, 1903.

- Nos.
2803. Petition of the Railroad Wharf and Storage Company for license to build a bulkhead and fill solid on Mystic River, in Boston. Granted Nov. 6, 1903.
2804. Petition of Charles M. Hinkle, Thomas T. Gaff and Gordon Shillito for license to build and maintain boat-ways on Centreville River at Osterville, in Barnstable. Granted Nov. 9, 1903.
2805. Petition of the Walworth Manufacturing Company for license to extend its wharf, partly solid and partly on piles, in Boston harbor near the Reserved Channel, at South Boston. Granted Nov. 17, 1903.
2806. Petition of the Boston Elevated Railway Company for license to dump snow and ice into tide waters. Granted Nov. 23, 1903.
2807. Petition of the Union Freight Railroad Company for license to dump snow and ice into Charles River from the yard of the Fitchburg Railroad Company at the foot of Haverhill Street, in Boston. Granted Nov. 24, 1903.
2808. Petition of the city of Boston for license to repair its north-west wharf at Long Island, in Boston harbor. Granted Nov. 25, 1903.

PETITIONS DENIED.

In December, 1902, a hearing was given on petitions of Horace B. Maglathlin and Sarah A. Hammond for licenses to maintain flumes and draw water from Silver Lake, in Halifax. It appearing that the Legislature has authorized, by chapter 356 of the Acts of 1899, and other statutes, the taking of water from this lake for domestic purposes, the petitioners were given leave to withdraw.

On Dec. 31, 1902, a petition was received from Clorus L. Gonyon for license to build and maintain a wharf in Lake Anthony, in Cottage City. This petition was opposed by owners of adjoining property on grounds satisfactory to the Board, and the petitioner was given leave to withdraw.

On Feb. 13, 1903, the petition of Clara T. Perkins for license to widen a wharf, on piles, in Gloucester harbor, was considered, and inasmuch as the proposed work would inadvisably curtail the dock area in that portion of the harbor, the petitioner was given leave to withdraw.

On March 24 the Board refused to grant permission to F.

H. Williams to remove material from the outside beach near the foot of Q Street at Point Allerton, in Hull, because the provisions of chapter 45 of the Acts of 1864 prohibit the removal of material from this portion of the beaches in Hull.

For the same reason on April 17 the Board refused to grant permission to George A. Barron to remove material from Ocean Beach near Bayside Station.

On July 6 the Board refused to grant the city of New Bedford authority to dump dredged material upon Egg Island shoals in New Bedford harbor, as the material would necessarily be of an objectionable nature, and, in the opinion of the selectmen of Fairhaven, would be liable to create a nuisance if dumped in the locality desired.

On July 22 the Board dismissed the petition of Messrs. Puffer and Perkins for revocation of license granted by the Board July 18, 1901, to Alice V. McAloon to build a wharf in Buzzards Bay in the town of Wareham, as a favorable decision would involve a question of title to land not raised at the hearing on her original petition.

On September 9 the Board refused to grant a license on the petition of James Chalifour for authority to build a sea wall and do certain filling in Salem harbor, as it appeared that the petitioner was not the owner of the land on which a portion of the wall was to be built.

On September 14 the petition of Charles L. Gifford for license to build a bridge across Santuit River was dismissed, because it was beyond the jurisdiction of the Board to license a bridge structure in the locality desired.

On September 18 the Board declined to lease Grape Island in Lake Winthrop, Holliston, to the petitioner, J. H. Grady.

On October 21 the Board heard the petition of Ezold Brothers for license to construct a building and boat landing in and over Pequot Lake, a great pond in Westfield. The granting of this license was opposed by the selectmen of the town of Westfield and by the Woronoco Street Railway Company, on the ground that the ordinary high-water mark of the lake at this point lies within the location of the highway adjoining the lake; that the petitioners' upland did

not border on the lake ; that a boat landing located as desired would be dangerous, as it could not be reached without crossing the present line of electric car tracks ; and that a steep embankment several feet high, on top of which the car tracks are laid, without space for a sidewalk on the pond side, must be descended or ascended to and from the proposed landing. The petitioner was given leave to withdraw.

MISCELLANEOUS PERMITS GRANTED DURING THE YEAR.

ISAAC BLAIR & Co., to dump snow from Dover Street bridge into tide water, in Boston. Granted Dec. 26, 1902.

ELIZABETH A. HICKEY, to remove material from the beach at North Scituate. Granted Jan. 9, 1903.

A. A. ELSTON & Co., to dump snow from Federal Street bridge into Fort Point Channel, in Boston. Granted Feb. 18, 1903.

JOSEPH L. BOARDMAN, to remove gravel from Salter's Beach, in Plymouth. Granted March 18, 1903.

WILLIAM B. BIRD, to remove gravel from the beach lying between Crow Point and Jarvis Avenue, in Hingham. Granted March 30, 1903.

TRUSTEES OF THE MAIN STREET LAND TRUST, to dredge material from their flats in Charles River, on the Cambridge side of the channel, near Cambridge bridge. Granted April 8, 1903.

JOAQUIN K. FERREIRA, to use and occupy Quarantine Rock, in Boston harbor. Granted April 15, 1903.

CITY OF BOSTON, to lay a water pipe in a way leading from Summer Street on the Commonwealth's flats at South Boston. Granted April 17, 1903.

NANTASKET BEACH STEAMBOAT COMPANY, to drive piles and construct and maintain dolphins in Weir River, in Hull. Granted May 4, 1903.

ALBERT J. WEST, to remove a portion of the bar extending easterly from the east end of Park Island, in Hull Bay. Granted May 5, 1903.

FRANK J. HANNON, to use for storage purposes a frontage of the sea wall on the northerly side of the Reserved Channel, on the Commonwealth's flats at South Boston. Granted June 15, 1903.

GEORGE B. ROBERTS and ELMER H. BRIGHT, to dredge their flats in Charles River adjoining the parkway, in Cambridge. Granted June 19, 1903.

BROWN-WALES COMPANY, to lay and operate a railroad track in C and Egmont streets, on the Commonwealth's flats at South Boston. Granted June 22, 1903.

JOSEPH J. CALLAHAN, to build a temporary pile wharf in Dorchester Bay, at Squantum. Granted June 30, 1903.

CAMBRIDGE BRIDGE COMMISSION, to dredge a channel in Charles River. Granted July 7, 1903.

COHASSET YACHT CLUB, to dredge a channel and basin in Cohasset harbor. Granted July 17, 1903.

CHARLES C. WILLIAMS, to dredge a basin in Cohasset harbor. Granted July 30, 1903.

TIMOTHY L. WHITE, to dredge a channel and basin in Manchester harbor. Granted Sept. 3, 1903.

ALBERT WATTS, to remove material from his flats in Boston harbor near Sunnyside and Pico avenues, in Winthrop. Granted Sept. 8, 1903.

NANTASKET BEACH STEAMBOAT COMPANY, to remove accumulations of sand in the berths and around Pemberton Pier, in Hull. Granted Sept. 15, 1903.

LAKE GROVE CEMETERY ASSOCIATION, to use and occupy Grape Island in Lake Winthrop, in Holliston. Granted Sept. 22, 1903.

WORK OF THE UNITED STATES IN RIVERS AND HARBORS OF THE COMMONWEALTH.

The Board is indebted to Lieut.-Col. W. S. Stanton, Corps of Engineers, U. S. A., who is in charge of river and harbor improvements in eastern Massachusetts, and Capt. Cassius E. Gillette, Corps of Engineers, U. S. A., who is in charge of similar work in southern Massachusetts, for the following statements, which show the work accomplished in the rivers and harbors of this Commonwealth during the fiscal year ending June 30, 1903 :—

STATEMENT OF LIEUT.-COL. W. S. STANTON, CORPS OF ENGINEERS, U. S. A.

BOSTON, MASS., Dec. 8, 1903.

Harbor and Land Commissioners, Commonwealth of Massachusetts, State House, Boston, Mass.

SIRS :—In accordance with your request of Oct. 15, 1903, I have the honor to furnish the following summary of work done by the United States during the fiscal year that closed June 30, 1903, in the rivers and harbors in Massachusetts under my charge.

Merrimac River.

Under a contract for dredging the channel 7 feet deep at mean low water and 150 feet wide through all shoals below Haverhill, 17,576 cubic yards were dredged from two shoals at and within $1\frac{1}{2}$ miles of Rocks bridge. At the close of the fiscal year dredging was in progress, and the channel was completed except at that locality.

Breakwater for Harbor of Refuge, Sandy Bay, Cape Ann.

Under a contract for continuing the construction of this breakwater, 137,682 tons of stone were deposited during the year, completing the substructure for a length of 475 feet and a part of the core of the superstructure. At the close of the fiscal year work was in progress; 3,500 linear feet of the substructure of the southern arm, and about 875 feet of the substructure of the western arm, had been practically completed.

Rockport Harbor.

In rebuilding the Bearskin Neck breakwater at the harbor entrance, 1,332 tons of rubblestone were deposited, completing 160 linear feet. Work was in progress at the close of the fiscal year.

Gloucester Harbor.

Under the contract for completing the breakwater on or before Sept. 30, 1906, 2,364 tons of dimension stone and 1,742 tons of rubblestone were placed in 216 feet of superstructure. At the close of the year the substructure extended 1,750 feet and the completed superstructure 277 feet from the shore, and work was in progress on the superstructure.

Lynn Harbor.

Under a contract for dredging 95,000 cubic yards, 44,783 cubic yards were dredged, obtaining a channel 15 feet deep at mean low water, 100 feet wide, and extending from the deep basin opposite Little Nahant 2,600 feet toward the sea, to which, it is expected, the channel will be extended under the contract. Work was in progress at the close of the year.

Boston Harbor.

In the upper main ship channel 12,260 cubic yards were dredged, completing it to the full dimensions authorized by law, 27 feet deep at mean low water and 1,000 feet wide, from Boston,

16,000 feet to President Roads, except the removal of 10 ledges containing 3,404 cubic yards of rock.

In the lower main ship channel, from President Roads through the Narrows to the sea, drilling and blasting under a contract for the excavation of 19,008 cubic yards for the removal of 21 ledges were commenced Oct. 25, 1902, and were in progress at the close of the fiscal year.

In Broad Sound, under a contract for dredging a channel 30 feet deep at mean low water and 1,200 feet wide, 240,681.5 cubic yards of mud, sand, gravel and clay were dredged.

On April 10, 1903, when the channel had been dredged to a minimum width of 930 feet and minimum depth of 28 feet at mean low water, it was buoyed, and range lights were established on Lovell's Island and Spectacle Island for its safe navigation. Its completion to the full depth of 30 feet and full width of 1,200 feet is expected by Dec. 31, 1903.

In February, 1903, under the project authorized by act of Congress, approved June 13, 1902, to obtain a channel 35 feet deep at mean low water, 1,200 feet in width in the upper main ship channel from Boston to President Roads, and 1,500 feet in width from President Roads to the sea at Broad Sound, four contracts were made for dredging in the aggregate 9,780,000 cubic yards, of which 7,500,000 will be dredged from the upper main ship channel and 2,280,000 from the channel to Broad Sound. The completion of these contracts, which is required by Dec. 31, 1907, will obtain a channel 35 feet deep at mean low water from Boston to Broad Sound, about 500 feet wide in the upper main ship channel and about 675 feet wide in the Broad Sound channel. Dredging under one contract commenced April 6, and to June 30 60,881 cubic yards of clay had been dredged in uncovering a considerable area of rock in the upper main ship channel in order that its excavation might be commenced with the least delay practicable.

The extensive rebuilding and repair of the three sea walls on Deer Island, large portions of which were demolished in the storm of November, 1898, were continued. At the close of the fiscal year the rebuilding of the two walls, at the north and middle heads, had been practically completed, and the rebuilding of the wall at the south head had been commenced. The extensive repointing of the sea walls on Great Brewster, Gallop's, Long and Lovell's islands, which was commenced in 1901, was in progress throughout the fiscal year, and was well advanced towards completion at its close.

In Chelsea Creek, 4,732 cubic yards of mud were dredged, obtaining a channel not less than 50 feet wide and 14 feet deep at mean high water to Proctor's wharf.

Mystic and Malden Rivers.

In the Mystic River, below the mouth of Island End River, 81,241.5 cubic yards of mud, sand and clay were dredged from the channel at the confluence of Island End River, obtaining a channel with a minimum width of 150 and maximum width of 300 feet, 25 feet deep at mean low water, to a point 400 feet above the mouth of Island End River. From the draw-way of Chelsea bridge a mass of refuse timber, which had diminished the depth to 21 feet, was removed, restoring it to 25 feet at mean low water.

Cohasset Harbor.

In the harbor 10,330 cubic yards of mud, sand, gravel and clay were dredged, obtaining a channel 2,000 feet in length, 4 feet deep at mean low water, 60 feet in width except at the curves, where it is increased to 75 feet. Work was in progress at the close of the fiscal year for continuing the dredging and for removal of a ledge from the channel.

Plymouth Harbor.

From the turning basin at the wharves 12,200 cubic yards of mud and sludge were dredged, restoring an area of about 3 acres to a depth of 9 feet at mean low water, to which depth it had been before redredged, in 1899.

Provincetown Harbor.

Three groynes of timber and brush, 150 feet apart, 180 feet in length, were built upon the beach at Abel Hill dike, which prevented encroachment of the sea upon the beach and dunes during the winter.

Very respectfully, W. S. STANTON,
Lieutenant-Colonel, Corps of Engineers.

Statement of Captain Cassius E. Gillette, Corps of Engineers, U. S. A., showing the work done by the United States on the rivers and harbors in Massachusetts under the Newport, R. I., engineer office during the fiscal year ending June 30, 1903 :—

Hyannis Harbor.

A contract for about \$18,000 worth of dredging was entered into Dec. 8, 1902, work to commence not later than April 1, 1903, extended to June 1, 1903, and later to June 15, 1903, and to be completed within six months of the time of commencement. Up to the close of the fiscal year the work had not been commenced.

Nantucket Harbor.

A contract was entered into for about \$6,120 worth of riprap stone to be placed in the east jetty under date of Jan. 19, 1903, work to commence not later than May 1, 1903, and to be completed July 8, 1903. The execution of the work contemplated under this contract was delayed, pending an examination of the effect of the breach in the Haulover Beach, on the jetty channel. A small amount of dredging was proposed near the outer end of the jetty channel to connect the 9-foot holes which had developed there. Proposals for this dredging were invited by public advertisement, but none were received.

Vineyard Haven.

No works of improvement have been in progress during the fiscal year. Further work at this harbor is dependent upon the results of the examination of the Board of Engineers, convened in accordance with the river and harbor act of June 13, 1902, to consider the general subject of harbors in the waters of this locality.

Woods Hole Channel.

A contract was entered into Dec. 11, 1902, for dredging and removing boulders to the amount of about \$18,000, at the rate of \$3.47 per cubic yard for all material other than boulders exceeding 1 cubic yard in size, for which the price was \$10 per cubic yard. The work was commenced May 19, 1903, and up to the close of the fiscal year 4,341 cubic yards of clay, gravel and small boulders and 42,272 cubic yards of the large boulders were removed, nearly completing the contract. The main channel has been cleared of all obstructing shoals for its full width, excepting two small shoals on the northern edge of the channel near Devil's Foot Island and the main shoal at the eastern end, through which a channel 225 feet wide has been dredged to the full projected depth of 13 feet at mean low water.

New Bedford Harbor.

A contract was made Dec. 2, 1902, for dredging the remainder of the anchorage area in this harbor, and redredging any shoaling that may have occurred in the channel through the draw. Amount of contract, about \$34,000. Time of commencement, Jan. 16, 1903, to be completed nine months after commencement. Price of dredging 19½ cents per cubic yard. On March 13, 1903, the dredge was temporarily removed to other work. Up to this date 45,124 cubic yards of mud, clay and sand had been removed. A map of

a proposed harbor line for New Bedford harbor was submitted Dec. 29, 1902, and approved March 8, 1903, by the Secretary of War.

Taunton River.

A contract was entered into April 28, 1903, for dredging the shoals that had formed in the previously dredged channel near Dighton wharf and below Wickamount. Amount of contract, about \$5,000. Price of dredging, 88 cents per cubic yard. The dredging was commenced May 19 and completed July 3, 1903.

Fall River Harbor and Mount Hope Bay.

A continuing contract was entered into Dec. 2, 1902, for dredging the proposed channel 300 feet wide and 25 feet deep at mean low water in front of the city and across Mount Hope Bay to the deep water of Narragansett Bay. Amount of contract, about 1,081,000 cubic yards. Price, 13.1 cents per cubic yard. Up to the close of the fiscal year 293,235 cubic yards had been dredged, and the work was in progress.

Removal of Wrecks.

During the fiscal year the following wrecks were removed so as no longer to form obstructions to navigation: the steamer "Williamsport" from 2 miles north-east of Pollock Rip light ship; the schooner "Thomas Borden" from Hyannis harbor; the barge "Wadena" from the Shovelful Shoal, south of Monomoy Point; the schooner "St. Thomas" from 3 miles south-east of Cape Poge light-house in Muskeget channel; the schooner "James G. Blaine" from about 1 mile south-south-east from Monomoy Point light-house; the schooner "Emily G. Sawyer" from 1½ miles south-west from Harding's Beach light-house; the schooner "Sarah Potter" from near the Handkerchief shoal. The wrecks of the following vessels were reported as dangerous obstructions to navigation, and preparations were made for their removal: schooner "Marriot," sunk 10 miles west-south-west from Vineyard Sound light ship; schooner "Dora Methews," near Bass Rip, 3 miles east of Sankaty Head, Nantucket Island; schooner "Agnes E. Manson," sunk in same locality; and the barge "Fidelia," sunk 3 miles west of the Hen and Chickens lightship in the entrance to Buzzards Bay.

BRIDGE BETWEEN FALL RIVER AND SOMERSET.

Under chapter 462 of the Acts of 1903 the Board of Railroad Commissioners, the Board of Harbor and Land Commissioners and the county commissioners of the county of

Bristol were constituted a joint Board, and authorized and directed to locate and construct a new drawbridge between the city of Fall River and the town of Somerset, over Taunton Great River. The members of this commission have attended, up to the date of this report, meetings of the joint Board held July 13, September 17, October 12, November 16 and 20, and have listened to parties interested in the subject matter of the act. They also, in company with other members of the joint Board, have inspected the present Slades Ferry bridge across this river, used for highway, railroad and street railway purposes, and the several sites suggested for the location of the new bridge.

APPROPRIATION FOR SURVEY AND IMPROVEMENT OF HARBORS.

Under section 9 of chapter 96 of the Revised Laws, the Board is authorized to make surveys and improvements for the preservation of harbors, to repair damages along the coast line or river banks of the Commonwealth, and to take land or materials necessary for making such improvements or repairs. Section 10 authorizes the expenditure of not exceeding \$10,000 in carrying out the provisions of section 9.

Expenditures from this appropriation have been made during the year in the localities and to the amounts following, viz.:—

Bass River in Beverly, survey,	\$539 81
Bass River at South Yarmouth, survey, . .	116 10
Connecticut River, repairs,	1,112 51
Easterly shore of Dorchester, survey, . .	220 02
Lake Anthony, improvement,	204 01
Menamsha Inlet, survey,	43 01
Nantucket harbor, improvement,	1,043 50
Northerly shore of Quiney, survey,	60 00
Scituate, survey,	54 13
Shirley Gut, survey and improvement, . .	452 00
Stage Harbor, Chatham, survey,	65 88
Weymouth Fore River, survey,	150 31
West Bay at Osterville, improvement, . .	140 80
Winthrop Channel, survey,	78 00
Total,	<hr/> \$4,280 08

HARBOR COMPENSATION FUND.

There was paid into the treasury of the Commonwealth during the year, under chapter 146 of the Acts of 1897, and chapter 96 of the Revised Laws, for tide water displaced by work done under licenses granted by the Board, and for rights and privileges granted in tide waters and great ponds, the sum of \$26,995.32, which was credited to the harbor compensation fund for Boston harbor. The amount in this fund on Nov. 30, 1903, was \$416,896.40; the balance of income from this fund in the treasury on the same date was \$6,150.50; the total income for the year was \$14,510.68.

COMMONWEALTH'S FLATS IMPROVEMENT FUND.

The balance in the Commonwealth's flats improvement fund on the first day of December, 1902, was \$1,516,362.95. To this has been added during the year \$67,898.94 from the income of the fund and \$30,167.55 from sales and rents of lands and other sources, making a total of \$1,614,429.44. Of this sum there has been expended during the year \$248,195.89, leaving a balance on Nov. 30, 1903, of \$1,366,233.55, subject to reduction for existing liabilities by reason of the anchorage basin contracts under chapter 476 of the Acts of 1901, for contribution toward building Northern Avenue and bridge under section 4 of chapter 381 of the Acts of 1903, and for filling the 26-acre lot on the Commonwealth's flats at South Boston.

A list* of the acts and resolves showing the trend of legislation relative to subject matters within the jurisdiction of this Board, from 1899 to 1903, inclusive, has been compiled as a ready reference, and is printed in the Appendix.

The foregoing report is respectfully submitted.

WOODWARD EMERY,
CHARLES C. DOTEN,
GEORGE E. SMITH,

Commissioners.

DEC. 1, 1903.

* See Appendix D.

APPENDIX.

APPENDIX.

[A.]

[See page 4 of this report, *ante.*]

CONTRACTS.

The contracts entered into during the year are as follows : —

1903.

March 26.	With George H. Cavanagh, for building a spruce bulkhead on the Commonwealth's flats, at South Boston, for the sum of \$7.90 for each lineal foot of bulkhead, and 60 cents for each lineal foot of horizontal platform and levelling the filling under the same, — amounting to	\$5,763 10
June 15.	With John H. Gerrish, for dredging channel at the mouth of Bass River, in Dennis and Yarmouth, — amounting to	6,500 00
July 28.	With John H. Gerrish, for dredging channel at Menamsha Inlet, in Gay Head and Chilmark, — amounting to	8,250 00
Oct. 16.	With the Harries & Letteney Company, for dredging channel in Weymouth Fore River, in Quincy, — amounting to about	8,000 00
Total, about		<hr/> \$28,513 10

[B.]

[See page 15 of this report, *ante*.]

LICENSE TO BROWN-WALES COMPANY.

WHEREAS, The Brown-Wales Company, a corporation duly established under the laws of the Commonwealth, has applied to the Board of Harbor and Land Commissioners for authority to lay and operate a track on C and Egmont streets on the Commonwealth's flats at South Boston, —

Now, said Board, by virtue of chapter 377 of the Acts of 1902, and all other acts thereto enabling, hereby authorizes and licenses the Brown-Wales Company to lay and operate, at grade, a railroad track in C and Egmont streets as shown on the accompanying plan, subject to the authority and control of the Railroad Commissioners as provided by said statute ;

But this license is granted by the Board upon the following express conditions, that : —

First, all tracks shall be laid on wooden ties with 7-inch girder rails of a pattern approved by the chief engineers respectively of the New York, New Haven & Hartford Railroad Company and of this Board ; the space between the rails and 18 inches outside the same shall be paved with granite blocks on a gravel foundation ; and all work and material shall be of a substantial character, and to the satisfaction of the respective chief engineers aforesaid.

Second, the licensee shall at its own sole expense keep the tracks in said streets in good condition and repair, and properly guarded and protected for the passage of teams along said streets and over said tracks.

Third, no car shall be permitted to stand in C Street or Egmont Street for the purpose of loading and discharging, nor be or remain in said streets at any time except for the purpose of shunting between the premises of the licensee and the railroad yards, and then only for such reasonable time as may be necessary therefor.

Fourth, the licensee shall be liable for any injury, and shall assume and pay any and all damages caused by the laying and operation of the tracks hereby authorized.

Fifth, the licensee shall permit the use of the tracks hereby authorized in said streets, by any other person or corporation licensed therefor by this Board, upon payment to the licensee of a reasonable compensation to be agreed upon by the parties, or, in the event of the parties failing to agree, to be determined by the Board of Railroad Commissioners.

Sixth, the track hereby authorized to be laid shall be removed or shall be changed to other locations in said streets and relaid by the licensee and the premises left suitable for public travel, at its sole expense, upon the order of this Board, after notice and hearing, and determination that the further continuance thereof as laid is detrimental to the public interest; and if the licensee shall fail or neglect to carry out the order of the Board for a period of ten days after notice thereof, then this Board may perform the requirements of said order at the expense of the licensee, and recover the same in the name of the Commonwealth.

Seventh, said corporation shall file with the clerk of this Board, within thirty days of the date of this license, its acceptance of the same, and its agreement to comply with the requirements thereof; in case of failure to file said acceptance and agreement, or of failure subsequently to perform any of the foregoing requirements, or of failure to lay the tracks in C and Egmont streets as aforesaid within one year from the date of the approval hereof by the Governor and Council, then and thereupon this license shall be null and void.

IN WITNESS WHEREOF, said Harbor and Land Commissioners have hereunto set their hands this twenty-second day of June, in the year nineteen hundred and three.

WOODWARD EMERY,
CHAS. C. DOTEN,
GEO. E. SMITH,

Harbor and Land Commissioners.

COMMONWEALTH OF MASSACHUSETTS.

BOSTON, June 26, 1903.

Approved by the Governor and Council.

EDWARD F. HAMLIN,
Executive Secretary.

At a duly notified meeting of the directors of the Brown-Wales Company, held at Boston the first day of July, 1903, at which a quorum was present, the following votes were passed:—

Voted, That the Brown-Wales Company hereby accepts the license from the Board of Harbor and Land Commissioners, dated June 22, 1903, to lay tracks to its premises on C and Egmont streets, South Boston, and agrees to comply with the requirements thereof.

Voted, That a copy of this vote shall be filed forthwith with the said Board.

A true copy. Attest:

WM. H. SHURTLEFF,
Sec'y.

[C.]

[See page 36 of this report, *ante*.]

REPORT OF THE SUPERINTENDENT, PROVINCE LANDS.

PROVINCETOWN, MASS., DEC. 1, 1903.

To the Board of Harbor and Land Commissioners.

GENTLEMEN: — As superintendent of the Province Lands, I respectfully submit the following report for the year ending with November, 1903.

The work has been carried along on practically the same lines as in former years, which consisted principally in transplanting grass, shrubs and trees, and the planting of pine seed. Active operations for the season began about the middle of March and continued until the last of May, when work was suspended for the summer months, being resumed about the middle of September, and continuing, as the weather permitted, through November. Only a small area of grass was planted during the spring months, the principal work being the planting of shrubs, trees and seed, which was done along the slopes that had been covered with grass in former years. Fairly good results were obtained, although the weather conditions were extremely unfavorable, a serious drought prevailing most of the time, which prevented many of the seed germinating and plants taking root.

The fall work, which was undertaken about the middle of September, consisted of the transplanting of beach grass and bayberry, thus covering an area of about 25 acres, including a small area of grass planting done in the spring. The bayberry was used along the upper portion of the slope, and the grass along the lower or flat portion, in the same manner as during the season of 1902.

Operations were carried on at that point upon the middle range of dunes where the work ended in the fall of 1902, that range being finished, and, in addition thereto, a section of about 10 acres covered on the south range eastward from Bennetts road.

The completed work shows gradual and decided improvement, especially along the northern range, where the reclamation was first commenced. The young pines and other trees, also the shrubs, for about a mile along this slope exhibit a vigorous and

healthy growth, which would seem to warrant the continuation of the improvement along the lines adopted, and the possibility of extending the variety of tree growth.

The road running across the lands and terminating at the outer beach or ocean side of the reservation is in good condition, and is much used by the public.

Since the commencement of operations upon these lands representatives of the Agricultural Department at Washington, D. C., particularly of the division of Agrostology, have frequently inspected the work, and shown great interest in its progress. I have been informed by a gentleman who has just returned from Europe, where he made an examination of similar works of reclamation which have been in progress for more than fifty years, that it is carried on there practically upon the same lines as it is on the Province Lands, and with about the same results.

Respectfully submitted,

JAMES A. SMALL,
Superintendent of the Province Lands.

[D.]

[See page 61 of this report, *ante*.]LIST OF ACTS AND RESOLVES FROM 1899 TO 1903,
INCLUSIVE.

- | Year. | Chapter. | |
|-------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1899. | 64. | An Act to cede certain land in Boston harbor, and jurisdiction over the same, to the United States, for the purpose of extending the present limits of the United States Navy Yard. |
| | 133. | An Act relative to the boundary line between the towns of Gay Head and Chilmark. |
| | 145. | An Act making an appropriation for the reclamation of the Province Lands for the benefit of Provincetown harbor. |
| | 155. | An Act relative to the construction of a channel from Vineyard Sound to Lake Anthony. |
| | 447. | An Act making an appropriation for the improvement of Green Harbor in the town of Marshfield. |
| | 448. | An Act to incorporate the Boston, Cape Cod & New York Canal Company. |
| | 463. | An Act to provide for the survey and improvement of harbors, and for repairing damages occasioned by storms along the coast line or river banks of the Commonwealth. |
| | 469. | An Act relative to the improvement of Boston harbor. |
| | 96. | Resolve to provide for certain surveys by the Board of Harbor and Land Commissioners. |
| | 99. | Resolve to provide for an investigation by the Board of Railroad Commissioners and the Board of Harbor and Land Commissioners relative to the relocating and widening of the old bridge over the Acushnet River between the city of New Bedford and the town of Fairhaven. |
| 1900. | 194. | An Act to provide for the improvement of the inner channel of Lewis Bay. |

- Year. Chapter.
1900. 309. An Act to provide for the survey and improvement of harbors, and for repairing damages occasioned by storms along the coast line or river banks of the Commonwealth.
434. An Act to provide for building jetties, breakwaters, sea walls or other structures in the town of Scituate, by the Board of Harbor and Land Commissioners.
439. An Act relative to the relocation and completion of the bridge over the Acushnet River between the city of New Bedford and the town of Fairhaven.
476. An Act relative to the Boston, Cape Cod & New York Canal Company.
33. Resolve to provide for a survey and estimate relative to the improvement of the harbor of Cuttyhunk.
42. Resolve to provide for a survey and estimate relative to the improvement of the entrance to Waquoit Bay in the town of Falmouth.
97. Resolve to provide for an examination and report by the Board of Harbor and Land Commissioners as to the anchorage of vessels in Boston harbor.
100. Resolve to provide for the protection of the town of Hadley against the further encroachments of the Connecticut River.
1901. 243. An Act to change the harbor line on the westerly side of Fish Island in New Bedford harbor.
245. An Act to change the harbor line on the northerly side of Charles River in the city of Cambridge.
398. An Act to provide for surveys and improvements for the preservation of harbors and for repairing damages occasioned by storms along the coast line or river banks of the Commonwealth.
399. An Act to provide for the further improvement of Lake Anthony in the town of Cottage City.
411. An Act to change a part of the harbor line on the northerly side of Charles River below Charlestown bridge.
419. An Act to change the harbor line in Boston harbor at Jeffries Point, East Boston.
469. An Act to transfer the powers and duties of the Commission on the Topographical Survey and Map of Massachusetts to the Board of Harbor and Land Commissioners.
476. An Act to provide mooring facilities and additional anchorage ground in Boston harbor.

Year. Chapter.

1901. 483. An Act to provide for the building of breakwaters, sea walls or other structures in the town of Hull by the Board of Harbor and Land Commissioners.
484. An Act to incorporate the South Bay Wharf and Terminal Company.
507. An Act to authorize the Commonwealth, the New England Railroad Company and the city of Boston to carry out certain obligations relating to Northern Avenue in said city.
38. Resolve to provide for a survey and estimate by the Board of Harbor and Land Commissioners as to the improvement of the harbor at Apponagansett in the town of Dartmouth.
39. Resolve to provide for a survey and estimate by the Board of Harbor and Land Commissioners as to the improvement of the entrance of Bass River in the towns of Dennis and Yarmouth.
66. Resolve to provide for a survey and estimate by the Board of Harbor and Land Commissioners as to the improvement of the entrance to Herring River in the town of Harwich.
94. Resolve to provide for the protection of the town of Hadley against the further encroachments of the Connecticut River.
102. Resolve to provide for additional surveys and estimates by the Board of Harbor and Land Commissioners as to the construction of a channel from East Bay in the town of Barnstable to Vineyard Sound.
104. Resolve to provide for surveys and estimates by the Board of Harbor and Land Commissioners as to the cost of constructing a ship canal from Taunton River to Boston harbor.
113. Resolve to direct the Board of Harbor and Land Commissioners to improve the channel at the entrance of Bass River, between the towns of Dennis and Yarmouth.
1902. 107. An Act making an appropriation for surveys, improvements and preservation of harbors, and for repairing damages occasioned by storms along the coast line and river banks.
174. An Act making an appropriation for improving the channel at the entrance of Bass River, between the towns of Dennis and Yarmouth.

Year. Chapter.

1902. 313. An Act to change a part of the harbor line on the Merrimac River, along the water front of the city of Haverhill.
377. An Act relative to B Street and C Street and to the sale of land in South Boston.
425. An Act to direct the Board of Harbor and Land Commissioners to dredge a part of the southerly shore of South Boston.
491. An Act to provide for the further improvement of the channel between Vineyard Sound and Osterville Bay in the town of Barnstable.
509. An Act to provide for the improvement by the Board of Harbor and Land Commissioners of Appona-gansett harbor in the town of Dartmouth.
511. An Act making an appropriation for the reclamation of the Province Lands for the benefit of Provincetown harbor.
58. Resolve to authorize the Board of Harbor and Land Commissioners to dispose of certain equipment used in improving the channel of the Connecticut River.
71. Resolve to provide for a survey and estimate by the Board of Harbor and Land Commissioners as to the improvement of Cataumet harbor.
82. Resolve to provide for printing the report of the Board of Harbor and Land Commissioners as to a canal from Taunton River to Weymouth Fore River.
124. Resolve to authorize the Board of Harbor and Land Commissioners to make a survey and estimate to determine the cost of acquiring a part of Mount Tom and Mount Nonatuck as a State reservation.
130. Resolve to provide for an investigation and estimate by the Board of Harbor and Land Commissioners of the cost of improving the channel from Scorton harbor to Barnstable Bay in the town of Sandwich.
1903. 149. An Act to establish the boundary line between the towns of Braintree and Holbrook.
150. An Act to provide that persons employed by the United States Geological Survey or by the Board of Harbor and Land Commissioners of the Commonwealth may enter upon public or private land in the Commonwealth.
194. An Act to establish a part of the boundary line between the towns of Hanson and Pembroke.

Year. Chapter.

1903. 258. An Act to cede to the United States government jurisdiction over a tract of land called the Graves, near the entrance to the harbor of Boston.
341. An Act to provide for dredging the channel of Bass River in the city of Beverly, and for widening the draw of Bass River bridge in that city.
363. An Act to change the harbor lines on the westerly and easterly sides of Fish Island in New Bedford harbor.
366. An Act to direct the Board of Harbor and Land Commissioners to dredge the northerly shore of Quincy between Wollaston and Squantum.
373. An Act to establish the boundary line between the towns of Andover and Tewksbury.
376. An Act to authorize the Board of Harbor and Land Commissioners to construct an entrance to East Bay at Osterville in the town of Barnstable.
378. An Act to establish a part of the boundary line between the towns of Belmont and Watertown.
379. An Act to establish a part of the boundary line between the towns of Concord and Carlisle.
380. An Act to establish the boundary line between the towns of Foxborough and Walpole, and a part of the line between the towns of Foxborough and Norfolk.
381. An Act relative to the laying out and construction of Northern Avenue and Sleeper Street in the city of Boston.
389. An Act to establish the boundary line between the town of Medfield and the towns of Dover, Walpole and Norfolk.
394. An Act to provide for the further improvement of the outlet from Menamsha Pond into Vineyard Sound.
439. An Act to direct the Board of Harbor and Land Commissioners to dredge the easterly shore of the Dorchester district of the city of Boston.
440. An Act to direct the Board of Harbor and Land Commissioners to improve the channel of Weymouth Fore River.
462. An Act to provide for the construction of a bridge over Taunton Great River between the city of Fall River and the town of Somerset.

Year. Chapter.

1903. 25. Resolve to provide for a survey and estimate by the Board of Harbor and Land Commissioners for a harbor of refuge at Quicks Hole in the town of Gosnold.
46. Resolve to direct the Board of Harbor and Land Commissioners to complete the improvement of the channel of Bass River between the towns of Dennis and Yarmouth.
47. Resolve to authorize the Board of Harbor and Land Commissioners to build certain structures in the vicinity of Stage harbor in the town of Chatham.
71. Resolve to provide for a survey and estimate by the Board of Harbor and Land Commissioners as to the improvement of Annisquam River in the city of Gloucester.
82. Resolve to provide for the protection of the town of Hatfield against the further encroachment of the Connecticut River.

INDEX.

COMMISSIONERS' REPORT.

	PAGE
Anchorage,	8
Annisquam River,	19
Apponagausett Harbor,	26
Appropriation for Survey and Improvement of Harbors,	60
Bass River at Beverly,	33
Bass River at South Yarmouth,	31
Boston Harbor,	5
Boston Upper Harbor, Dredging in,	9
Commonwealth Flats at East Boston,	17
Commonwealth Flats at South Boston,	14
Commonwealth Pier,	15
Commonwealth Tide Lands,	4
Commonwealth's Flats Improvement Fund,	61
Compilation of Acts and Resolves, 1899-1903,	61
Connecticut River,	23
Dorchester, dredging Easterly Shore of,	10
Dorchester Bay,	10
East Bay at Osterville,	27
Fall River-Somerset Bridge,	59
Great Ponds, Islands in	34
Harbor Compensation Fund,	61
Inspections,	39
Lake Anthony,	30
Licenses granted during the Year,	42
Massachusetts Atlas Sheets and Town Boundary Atlases,	38
Meetings, Hearings, etc.,	3
Menamsha Inlet,	30
Miscellaneous Permits granted during the Year,	53
Nantucket Harbor,	26
Northern Avenue and Bridge,	16
Petitions denied,	51
Province Lands,	35
Quicks Hole, Harbor of Refuge,	24
Quincy, dredging Northerly Shore of,	11
Scituate,	27
Shirley Gut,	13
South Bay,	18
Stage Harbor,	25
State Land in Russell,	35
Town Boundary Survey,	36

	PAGE
United States, Work of, in Rivers and Harbors of the Commonwealth,	54
Statement of Lieut.-Col. W. S. Stanton, Corps of Engineers, U. S. A.,	54
Statement of Capt. Cassius E. Gillette, Corps of Engineers, U. S. A.,	57
West Bay at Osterville,	29
Weymouth Fore River,	11
Winthrop Channel,	12
Wrecks,	38

APPENDIX.

Contracts entered into during the Year,	65
License to Brown-Wales Company,	66
List of Acts and Resolves, 1899-1903, inclusive,	71
Report of the Superintendent of the Province Lands,	69

